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THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, F. L. S.,

BRITISH MUSEUM (NATURAL HISTORY), SOUTH KENSINGTON.

VOL. XXII.

MISSOURI
BOTANICAL
GARDEN.

ILLUSTRATED WITH PLATES AND WOODCUTS.

LONDON:

WEST, NEWMAN & CO., 54, HATTON GARDEN.

1884.

Directions to Binder.

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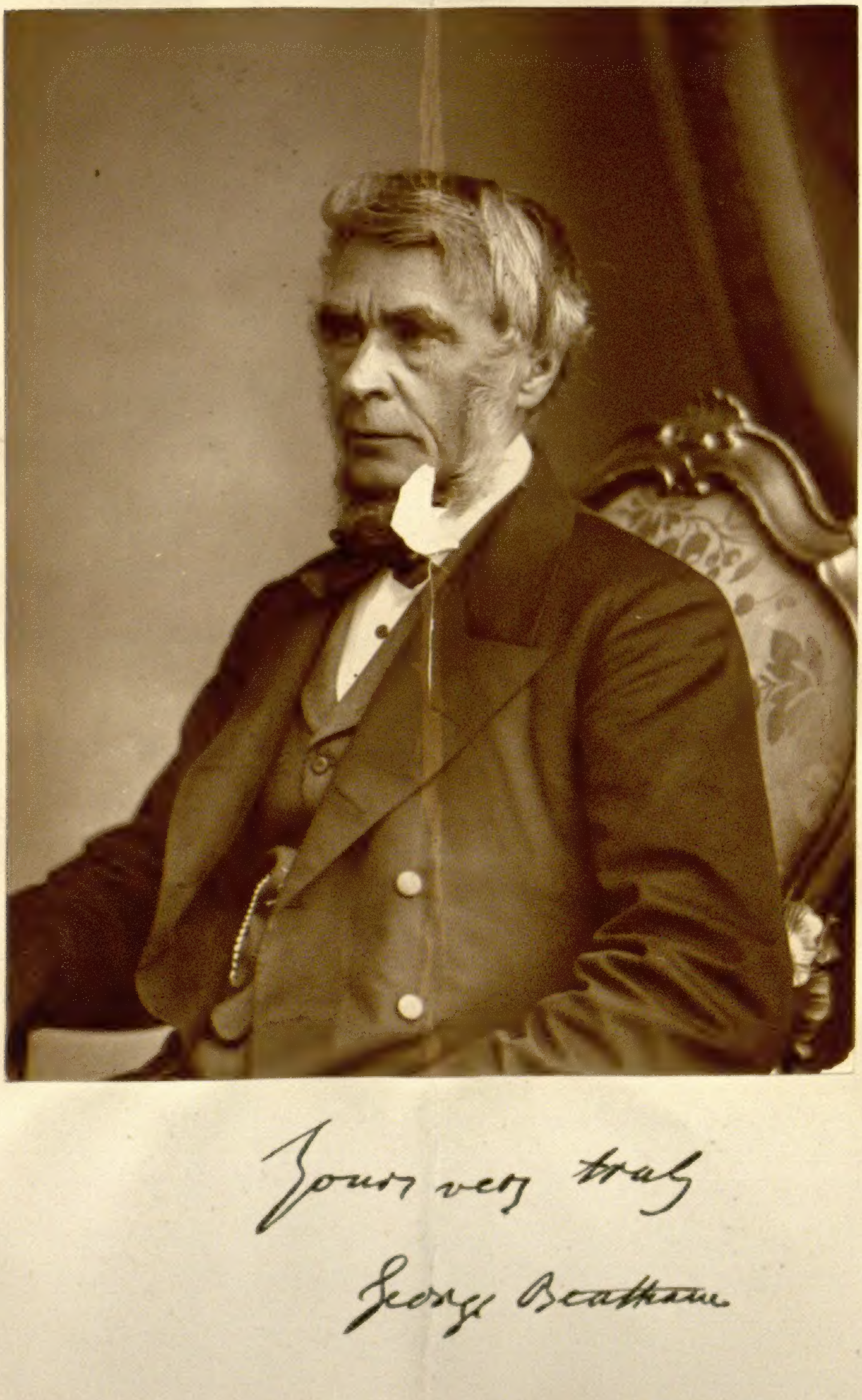

Yours very truly

George Beckham

THE

JOURNAL OF BOTANY,

BRITISH AND FOREIGN.

NOTES ON THE BRITISH *CHARACEÆ* FOR 1883.

By Henry & James Groves.

(Tab. 242.)

The following notes, collected during the past year, are in continuation of our paper in Journ. Bot. 1883, p. 20, and previous papers. The most important records are *Chara Braunii*, from Lancashire, not previously found in Britain; a new variety of *C. fragilis*, from Perth; *C. vulgaris* var. *melanopyrena*, from Cornwall; and *Tolypella prolifera*, from Lincoln.

We have to thank our correspondents for the large number of specimens we have received, and especially Mr. Arthur Bennett for many specimens which he has transmitted to us from other botanists, besides those collected by himself.

Much still remains to be done, in working out the comital distribution; from many counties we have only received one or two species, and from the following we are still without a single record:—

Somerset S., Wilts N., Gloster E., Monmouth, Worcester, Glamorgan, Brecon, Carmarthen, Denbigh, Flint, Cheviotland, Man, Wigton, Ayr, Renfrew, Lanark, Selkirk, Linlithgow, Kincardine, Aberdeen N., Banff, Westerness, Dumbarton, Cantire, Ebudes M. S. & N., Ross E. & W., Hebrides, Cork S., Waterford, Tipperary N., Kilkenny, Carlow, Queen's Co., Wexford, Kildare, Meath, Limerick, Clare, King's Co., Longford, Roscommon, Mayo E., Monaghan, Armagh, and Tyrone.

We shall be especially glad of specimens, or even the loan of specimens, from these counties.

Chara fragilis, Desv.—Wilts S., 1883, *H. & J. G.*; Dorset, 1883, *J. G.*; Suffolk W., 1882, *E. F. Linton*, comm. *A. Bennett*; Norfolk E., 1883, *H. G.*; Fife, 1878, *F. Buchanan White*, comm. *A. Bennett*; Elgin, 1883, *J. Keith*; Argyle, 1883, *H. & J. G.*; Fermanagh, *R. M. Barrington*; Tipperary S., 1872, *Miss Grubb*.

var. *barbata*.—Caithness, 1883, *J. Grant*, comm. *A. Bennett*.

var. *capillacea*. — Bucks, 1882, *J. Saunders*; Westmoreland,

1865, *W. P. Hiern*; Perth M., 1883, *R. Braithwaite*; Perth E., 1883, *A. Sturrock*.

var. *Hedwigii*.—Lincoln S., 1883, *W. H. Beeby*; Roxburgh, 1880, *A. Brotherston*; Perth E., 1883, *A. Sturrock*; Forfar, 1882, *G. C. Druce*, comm. *A. Bennett*.

var. *delicatula*, Perth M., 1883, *R. Braithwaite*; Perth E., 1883, *A. Sturrock*; Argyle, 1883, *H. & J. G.*

var. *Sturrockii, var. nov.* — Stem 2–3 feet high, very imperfectly triplostichous. Spine-cells tubercular. Branchlets 1–3 in. long, with *all the segments ecorticate*. Bract-cells whorled.

This is a very remarkable plant, and, although we have included it under *C. fragilis* for the present, we think that an examination of a series of specimens may show characters on which to found a species. A form of *C. fragilis* var. *Hedwigii* occurs in the same loch, and, though much like this plant in size, &c., it differs in the cortication of the stem, as well as in the presence of cortical cells in the branchlets. We understand from Mr. A. Bennett that Prof. Nordstedt has proposed the name of *C. fragilis* var. *gymnophylla*; but, in view of the complication of nomenclature resulting from having several vars. *gymnophylla* in the same genus, we think it best not to adopt such names for varieties which appear permanent, and have distinctive characters other than those implied by the name.

C. ASPERA, Willd.—Norfolk E., Hickling Broad, 1883, *H. G.*; Lincoln S., Deeping Fen, 1883, *W. H. Beeby*; Lancs. S., Southport, 1883, *H. Searle*, comm. *A. Bennett*; York S., near Bromfleet. 1883, *T. Birks, jun.*; Perth E., Ardblair Loch, 1881, *A. Sturrock*, comm. *A. Bennett*; Caithness, Walter Loch, 1883, *J. Grant*, comm. *A. Bennett*; Fermanagh, Lough Erne, near Enniskillen, 1883, *S. A. Stewart*.

var. *subinermis*.—Anglesea, Coron Lake, 1881, *J. E. Griffith*, comm. *A. Bennett*; Perth E., near Blairgowrie, 1883, *A. Sturrock*; Orkney, Loch of Harray, 1882, *W. Irvine Fortescue*.

var. *lacustris*.—Galway W., Roundstone, *Herb. Woods* (in *Herb. Townsend*).

C. POLYACANTHA, Braun.—Suffolk W., Thelnetham Fen, 1883, *W. M. Hind*, comm. *A. Bennett*; Norfolk E., Roydon, 1883, *E. F. Linton*, comm. *A. Bennett*; York S.E., near Bromfleet, 1883, *T. Birks, jun.*; Kirkcudbright, Caldock Moor, 1883, *F. R. Coles*.

C. CONTRARIA, Kuetz.—Devon N., Braunton Burrows, 1864, *W. P. Hiern*; Norfolk E., Somerton Broad, 1883, *H. G.*; Leitrim, Lough Allen, 1883, *S. A. Stewart* (first record for Ireland).

C. HISPIDA, L.—Lincoln S., Deeping Fen, 1883, *W. H. Beeby*; Elgin, near Forres, 1883, *J. Keith* (a form near var. *rudis*); Sutherland W., 1881, *Miller*, comm. *A. Bennett*; Louth, Dundalk, 1883, *J. F. Crofts*, comm. *J. Saunders*; Sligo, Coolgagh Lake, 1883, *S. A. Stewart*.

var. *rudis*.—Perth E., near Blairgowrie, 1883, *A. Sturrock*; Easterness, Loch Brodie, Nairnshire, 1883, *J. Keith*.

C. VULGARIS, L.—Devon N., 1883, *W. P. Hiern*; Somerset N., 1883, *W. B. Waterfall*; Herts. and Beds., 1883, *J. Saunders*; Hunts, 1883, *A. Fryer*, comm. *A. Bennett*; Carnarvon, 1881, *C. Bailey*, comm. *A. Bennett*; Anglesea, 1882, *J. E. Griffith*, comm. *A. Bennett*; Lincoln S., 1883, *W. H. Beeby*; Lancs. N., 1865, *W. P. Hiern*; York S.E., 1883, *T. Birks, jun.*; Cumbérland, 1883, *W. B. Waterfall*; Perth E., 1883, *A. Sturrock*; Wicklow, 1866, *R. M. Barrington*.

var. *longibracteata*.—Devon N., 1864, *W. P. Hiern*; Cambs., 1863, *W. P. Hiern*; Norfolk E., 1883, *H. G. Glasspoole*, comm. *A. Bennett*; Cardigan, 1881, *E. Straker*, comm. *A. Bennett*; Lincoln S., 1883, *W. H. Beeby*; Derby, 1882, *T. B. Blow*; Chester, 1875, *F. M. Webb*; York S.W., 1882, *T. Birks, jun.*; Perth E., 1883, *A. Sturrock* (a very small form); Forfar, 1883, *A. Sturrock*; Louth, 1883, *J. F. Crofts*, comm. *J. Saunders*.

var. *papillata*.—Dorset, 1878, *H. Groves* (of Florence); Suffolk W., 1883, *W. M. Hind*, comm. *A. Bennett*; Lincoln S., 1883, *W. H. Beeby*.

var. *atrovirens*.—Forfar, 1882, *G. C. Druce*, comm. *A. Bennett*.

var. *melanopyrena*. *C. fœtida*, var. *melanopyrena*, Braun.—Cornwall E., near East Bridgerule, 1883, *W. M. Rogers*. This form is distinguished by its nucules having a black nucleus, instead of brown, as in the type. Braun remarks that it is very rare.

C. BRAUNII, Gmelin, Flora Badensis Alsatica, vol. iv. (Supp.) (1826), p. 646; Bischoff, Krypt. Gewachse (1828), p. 26, fig. 5; Wallm., Act. Stockh., 1852 (1854), p. 286; Nordst., Bot. Notis., 1863, p. 41; Crep., Flor. Belg. (1874), p. 556; Wahlst., Mon. öf Sver. och Norg. Char. (1875), p. 24; Lloyd, Flor. de l'Ouest, ed. 3 (1876), p. 393.

C. flexilis, Amici (non L.), Mem. Acad. di Modena, vol. i. (1827), p. 199.

C. Cortiana, Bertoloni (Amici, *l. c.* p. 204 ? *), Fl. Ital., vol. x. (1854), p. 16.

C. coronata, Bischoff, Krypt. Gewachse (1828), p. 26, fig. 7; Braun, Ann. des Sci. Nat. (1834), p. 353; Flora, 1835, vol. i., p. 60; Consp. Char. Europ. (1867), p. 4; in Cohn's Krypt. Flor. Schles. (1877), p. 403; Fragm. ein. Mon. der Char. (1882), p. 108; Kuetz., Sp. Alg. (1849), p. 520; Tab. Phyc. (1837), t. 43, f. 1.

Charopsis Braunii, Kuetz., Phyc. Gen. (1843), p. 319.

Nitella Braunii, Rab., Deutsch. Krypt. Flor. (1847), vol. ii., p. 197.

Chara Stalii, Visiani, Flor. Dalm., vol. iii. (1852), p. 334.

Charopsis Stalii, Meneghini, Att. del congr. di Genova (*fide* Braun).

Exs.—Braun, R. & S., 10, 64; Nordst. & Wahlst., 87; Lloyd, Alg. de l'Ouest de la France, 413; Schultz, Herb. Norm., 600;

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* Amici remarks :—"Se si dovesse della mia *Chara flexilis* formare una specie nuova si potrebbe, sequendo il parere del Chiarissimo Prof. Bertoloni, chiamarla *Chara cortiana* in onore del nostro Ab. Corti." Does this represent the publication of a description of *Chara Cortiana* ?

Malinverni, Erb. Critt. Ital., 604; Rabenhorst, 219, 279; Billot, 2995.

Stem moderately stout, much branched, *without cortical cells*. Whorls usually of 8–11 straight or slightly incurved branchlets. Stipulodes *in a single circle*, alternating with the branchlets. Branchlets of 4–5 segments, the ultimate very short, scarcely exceeding the bract-cells. Bract-cells, at the fruiting nodes, 5–7, usually shorter than the nucules. Nucules single or in pairs, ovate, I0–11 striate. Coronula short, slightly spreading. Nucleus black.

This species belongs to the group *Haplostephanæ*, Braun, having the stipulodes in a single circle. This section, although containing a large number of species, was not previously represented in this country. Our British plant is a rather large and slender form, with the branchlets very little contracted at the nodes. It is of a bright *Nitella*-like colour, with a black incrustation on the older parts. Our specimens are 4–8 in. long, but the larger, such as that from which our drawing is taken, apparently belong to a plant of from 12–18 in. high.

Chara Braunii was discovered by Mr. Charles Bailey near Reddish, South Lancs., in September last, in a canal in which the water is raised to an abnormal temperature by the hot water from the adjacent mills. *Naias alagnensis*, a native of Egypt, has been found in the same neighbourhood, and, as its introduction is ascribed to the use of Egyptian cotton in the mills, there seems a possibility of *C. Braunii*, also an inhabitant of Egypt, having been introduced by the same means, although the distribution of the latter is such as to make its occurrence in this county probable.

This is a variable species, and forms of it have been collected over a very wide range; in Europe it has been recorded by Braun from Spain, France, Belgium, Sweden, Norway, Finland, Germany, Austria, Italy, and Corsica; in Africa, from many districts, reaching south to Mozambique; in Asia, from Syria, India, Java, China, and Japan; in North America it is not uncommon, and Dr. Allen has given an account of nine forms in the 'American Naturalist' for May, 1882; it has also been collected in the Sandwich Islánds.

Braun adopted the name of *C. coronata*, quoting it, in 'Characeen Afrikas,' as of "*Ziz. ined. circa annum* 1814 (*sensu latiori*)"; the first publication of this name that we can find is in Bischoff, 'Krypt. Gewachse,' where "*C. Braunii* Gmel." aud "*C. coronata* Ziz." are given as separate species, the only distinguishing character shown being that "*C. coronata*" has two nucules together, while in "*C. Braunii*" they are solitary. Under Braun's first publication of the name (Ann. Sci. Nat.) we find "*Ch. coronata Ziz. Hujus subspecies climaticæ sunt: α Ch. Braunii Gmel., Fl. Bad! Ch. coronata Ziz. herb!*" Now as *C. coronata*, Ziz. = *C. Braunii*, Gmel., according to Braun's own showing, and the name *Chara coronata* had been already applied by Bischoff to a slight modification of *C. Braunii*, we cannot conceive what reason there could be for using the ambiguous name of *C. coronata*, instead of the certain and definite name *Braunii*, Gmel.

Our plate represents *C. Braunii*, from Reddish, from specimens kindly forwarded to us by Mr. Bailey; unfortunately it was collected too late to get a good representation, the plants having all been damaged and were throwing out a second growth of branches. The enlarged figure of a young branchlet shows the cells of the rudimentary secondary ring of stipulodes and cortex, which in the older whorls become invisible.

LYCHNOTHAMNUS STELLIGER, Braun.—In Braun's 'Fragmente' *Chara obtusa*, Desv., is included under *Lychnothamnus* with the above name. The development of the nucules is that of a *Lychnothamnus* rather than a *Chara*, but the position of this plant does not seem, to us, to be yet made out satisfactorily. We hope to be able to examine more specimens of it, and the other *Lychnothamni*, also *Lamprothamnus* (*L. alopecuroides*), during the coming year.

TOLYPELLA PROLIFERA, Leonh.—Lincoln S., Deeping Fen, 1883, *W. H. Beeby*. This has not been found in England since Borrer's time.

T. GLOMERATA, Leonh.—Devon N., Braunton Burrows, 1864, *W. P. Hiern*; Hunts, Somersham, 1883, *A. Freyer*, comm. *A. Bennett*; York S.E., ditch near Brough, 1878, *H. Parsons* and *T. Birks, jun.*; Forfar, Sands of Barrie, *F. Buchanan White*, comm. *A. Bennett*.

T. INTRICATA, Leonh.—Beds., near Luton, 1883, *J. Saunders*.

NITELLA TENUISSIMA, Kuetz.—Since the publication of our last "Notes" we have again seen the specimen in Herb. Borrer, used as a voucher for Norfolk, and find its locality "Roydon Fen, *Cambridge*," so we think it best to erase the record for Norfolk (Journ. Bot. 1883, p. 22, printed Norfolk W. instead of Norfolk E.).

N. GRACILIS, Ag.—Mr. Bennett forwarded to us last autumn some draggings, containing three scraps of this species, which he had received from Shropshire from Mr. Beckwith. The latter gentleman writes us that it was collected in a small deep pool, about 1-12th of an acre in extent; but, thinking we might exterminate it, declines to give us any indication of its locality.

N. TRANSLUCENS, Ag.—Dorset, near Corfe Castle, 1883, *J. G.*; Aberdeen S., Kinnaird Loch, 1883, *J. W. Trail*, comm. *A. Bennett*.

N. FLEXILIS, Ag.—Leitrim, Lough Allen, 1883, *S. A. Stewart* (first certain specimen from Ireland).

N. OPACA, Ag.—Devon N., 1864, *W. P. Hiern*; Berks, 1877, *W. P. Hiern*; Montgomery, 1880, *J. E. Vize*, comm. *A. Bennett*; Leicester, 1844, *A. Bloxam*; Peebles, 1883, *A. Craig Christie*; Perth E., 1881, *A. Sturrock*, comm. *A. Bennett*; Argyle, 1883, *H. & J. G.*; Orkney, 1883, *W. Irvine Fortescue*; Fermanagh, *R. M. Barrington*; Down, 1883, *S. A. Stewart*. We have received a specimen of this plant, collected by the Rev. E. F. Linton, near Killin, Mid Perth, at the extraordinary elevation of between 3100 and 3300 feet.

ON THE UPLAND BOTANY OF DERBYSHIRE.

By J. G. Baker, F.R.S.

So little has been recorded as to the plants which ascend amongst the upper levels of the midland counties of England, that the subject seems to be well worthy of further attention. Whilst staying lately at Buxton, in August, I took an aneroid barometer about with me, and made a full list of all the species I noticed as ascending to 200 yards and upwards. I suppose that in Derbyshire we may confidently assume that all three of Watson's zones of the agrarian region are fully represented. So far as I can judge, the contour-line of 150 yards may be taken as the boundary between the two lower zones. A large area in the southern part of the county is below this level. The limit between the mid-agrarian and super-agrarian zones I would place at 350 yards. The most interesting plants of the county are those of the limestone cliffs, which range in altitude from 200 to 400 yards above sea-level. The flora of the higher gritstone edges is very destitute of individuality, consisting almost entirely of species spread throughout Britain in grassy or moorland localities. In Yorkshire I used always to consider that the zones of the agrarian region were excellently marked out by the Rubi. The fruticose species (*cæsius* included, but *suberectus* excluded) everywhere reach to the top of the mid-agrarian zone, whilst *Chamæmorus* marks the lower limit of the arctic region. Applying this test in Derbyshire, 350 yards in height about equals 300 yards in Yorkshire; but there is plenty of *Chamæmorus* on the gritstone peaks down to where the *Pteris* ascends, at about 550 yards of elevation. The following are the estimates of altitude from which I worked as a basis:—

Axe Edge	1750 feet.
Mam Tor	1700 ,,
Railway above Burbage	1350 ,,
Waterloo Inn	1200 ,,
Buxton Market Place	1050 ,,
Millers Dale Railway Platform . .	1000 ,,
Wye, below Lover's Leap . . .	950 ,,
Wye, at Monsal Dale	600 ,,

Thalictrum montanum. Limestone cliffs in several places, ascending to Peveril Castle, 400 yards.

Ranunculus aquatilis, var. *penicillatus.* Very abundant in the Wye in Ashwood Dale and Millers Dale up to 300 yards. — Var. *peltatus.* In the grounds at Chatsworth.—*R. hederaceus.* Swamps up to 500 yards.—*R. Flammula*, *R. acris*, and *R. repens.* Common up to 500 yards.—*R. arvensis.* Not seen.

Caltha palustris. Swamps up to 500 yards.

Nuphar lutea. Pond at Chatsworth, 200 yards.

Papaver. Quite absent from the corn-fields. Only a scrap of *dubium* seen on a cliff in Monsal Dale, 200 yards.

Fumaria officinalis. Only seen once, near Haddon, 200 yards.

Sinapis arvensis. A common weed up to 450 yards.
Brassica Rapa. A frequent colonist up to 450 yards.
Erysimum Alliaria. Seen only once, near Haddon, 200 yards.
Cardamine pratensis. Common up to 500 yards. — *C. hirsuta.* Frequent in the limestone dales up to 350 yards.
Arabis hirsuta. Common on walls and cliffs of limestone up to 400 yards, at Peveril Castle.
Barbarea vulgaris. By the Wye, in Monsal Dale and Millers Dale up to 250 yards.
Nasturtium officinale. Abundant in streamlets up to 350 yards. —*N. palustre.* Stream near Buxton, 350 yards.
Cochlearia officinalis. Winnats and Peveril Castle, near Castleton, on limestone cliffs, 300–400 yards. A form intermediate between *littoralis* and *alpina.*
Capsella Bursa-pastoris. Common up to 450 yards.
Helianthemum vulgare. One of the commonest species of the limestone cliffs, 200–400 yards.
Viola palustris. Moors round Cat and Fiddle Inn, 500 yards.— *V. hirta.* Slopes of the limestone dales; Millers Dale, Monsal Dale, Taddington Wood, 200–250 yards. — *V. sylvatica.* Common up to 500 yards. — *V. arvensis.* A weed in garden ground at Burbage, 400 yards. — *V. lutea.* Grassy moors round Cat and Fiddle Inn up to 500 yards.
Drosera. None seen.
Polygala depressa. Grassy places up to 500 yards.
Silene inflata, var. *puberula.* Very characteristic in Monsal Dale, 200 yards. — *S. nutans.* Limestone cliffs of Millers Dale, 250–300 yards.
Lychnis diurna. Frequent in the limestone dales, ascending to Peveril Castle, 400 yards. — *L. Flos-cuculi.* Swamps up to 500 yards.—*L. Githago.* A corn-field weed up to 400 yards.
Cerastium glomeratum. Roadsides up to 450 yards in Goyt's Clough.—*C. triviale.* Common up to 500 yards.
Stellaria media. Common up to 450 yards. — *S. Holostea.* Woods up to 250 yards in Millers Dale. — *S. graminea.* Common up to 500 yds.—*S. uliginosa.* Swamps up to 550 yds. on Axe Edge.
Arenaria trinervia. Walls in Millers Dale up to 250 yards.— *A. serpyllifolia.* Common amongst the limestone up to 400 yards above Castleton.
Alsine verna. Walls of Peveril Castle, 400 yards.
Sagina apetala. Courtyard of Haddon Hall; roadside between Buxton and Burbage, 350 yds.—*S. procumbens.* Common up to 500 yds.—*S. nodosa.* Roadside on the moor above Burbage up to 500 yds.
Spergula arvensis. Not seen.
Montia fontana. Common in swamps up to 500 yards.
Hypericum perforatum. Common in the limestone dales, 200–350 yards. — *H. tetrapterum.* By the Wye in Monsal Dale, 200 yards. — *H. pulchrum.* Up to 450 yards in Goyt's Clough. — *H. hirsutum.* Common in the limestone dales, 200–350 yards.— *H. montanum.* Limestone cliffs in Ashwood Dale, near the Lover's Leap, 300–350 yards.

Malva sylvestris. Foot of cliffs in Monsal Dale, 250 yards.

Tilia. None that looked really wild.

Linum catharticum. Common up to 500 yards.

Geranium pratense. Very fine at the bottom of the limestone dales up to 300 yards. — *G. molle.* Frequent, ascending to 400 yards over Castleton. — *G. dissectum.* Wye Valley up to foot of Chee Tor, 250 yards. — *G. columbinum.* Taddington Wood and Wye Valley below Chee Tor, 250 yards. — *G. lucidum.* Common on walls and rocks in the limestone dales, 200–350 yards. — *G. Robertianum.* Common up to 350 yards.

Oxalis Acetosella. Common up to 450 yards.

Ilex Aquifolium. Frequent up to 350 yards.

Euonymus europæus. Limestone cliffs up to 400 yards over Castleton, native.

Rhamnus catharticus. Limestone cliffs in Millers Dale up to 300 yards.

Acer Pseudo-platanus. One of the commonest trees of the district up to 450 yards, and often self-sown. — *A. campestre.* Common in the limestone dales up to 350 yards.

Ulex europæus. Up to 400 yards over Burbage.

Anthyllis Vulneraria. Limestone banks, Millers Dale, &c., 250–300 yards.

Medicago lupulina. Common up to 400 yards.

Trifolium pratense and *T. repens.* Common up to 500 yards.— *T. medium.* Ashwood Dale, 300 yards.—*T. procumbens.* Frequent up to 400 yards on the walls of Peveril Castle. — *T. minus.* Frequent up to 450 yards over Burbage.

Lotus corniculatus. Common up to 500 yards. — *L. major.* Common up to 450 yards.

Vicia Cracca. Frequent up to 400 yards.—*V. sepium.* Ascends to 450 yards on the Burbage Moors.—*V. sativa.* A corn-field weed up to 540 yards.

Lathyrus pratensis. Common up to 400 yards.

Prunus spinosa. Native on the cliffs of the limestone dales up to 350 yards.—*P. Padus.* Cliffs about the Lover's Leap, 350 yards.

Spiræa Ulmaria. Common in the limestone valleys up to 300 yds.

Agrimonia Eupatoria. Millers Dale and Monsal Dale up to 250 yards.

Sanguisorba officinalis. Meadows, and even sometimes a corn-field weed up to 400 yards.

Poterium Sanguisorba. Common on limestone cliffs and banks, 200–400 yards.

Alchemilla arvensis. Only seen low down the Wye Valley, 200–250 yards. — *A. vulgaris.* Common up to 500 yards on the moor over Burbage.

Potentilla Fragariastrum. Limestone dales up to 300 yards. — *P. Tormentilla.* Ascends nearly to summit of Axe Edge, 550 yards. — *P. procumbens.* Moor over Burbage, 450 yards. — *P. reptans.* Chee Tor Dale, &c., 250 yards. — *P. Anserina.* Common up to 400 yards.

Fragaria vesca. Woods up to 350 yards.

Rubus Idæus. Common up to 450 yards in Goyt's Clough. — *R. suberectus*. None of the three subspecies occur.—*R. rhamnifolius*. Bottom of Monsal Dale, 200 yards. — *R. discolor*. None seen. — *R. leucostachys*. Monsal Dale, and roadside over Cressbrook Mill, 200–300 yards.—*R. unbrosus*. Monsal Dale and Wye Valley below Chee Tor, 200–250 yards.—*R. Radula*. Taddington Wood, 200–250 yards. — *R. pallidus*. One of the most frequent brambles of the limestone dales, ascending to 350 yards at the Lover's Leap. — *R. corylifolius*. Up the Wye Valley into Ashwood Dale, 300 yards.—*R. tuberculatus*. Frequent, ascending the Wye Valley to 350 yards near the Lover's Leap.—*R. cæsius*. Frequent in Millers Dale, &c., ascending to 300 yards over Cressbrook.—*R. Chamæmorus*. Abundant on the peak of Axe Edge, especially descending the clough on the north, 550 yards.

Rosa spinosissima. Monsal Dale, and plentiful about Cressbrook amongst the limestone *débris*, 200–300 yards.—*R. mollissima*. Frequent and characteristic in Millers Dale, Taddington Wood, &c., 200–300 yards. — *R. tomentosa*. Millers Dale, not plentiful, 200–300 yards. — *R. canina*. Common in the limestone dales, 200–300 yards. Forms specially noted: *lutetiana*, *dumalis*, *urbica* (a form of this with glandular sepals in Taddington Wood); *Reuteri*, *subcristata*, and *coriifolia*, all three characteristic in Millers Dale, and *marginata* near the school-church near Cressbrook House. — *R. arvensis*. Taddington Wood, and Wye Valley below Chee Tor; and about Cressbrook, 200–250 yards.

Geum urbanum. Common in the limestone woods up to 300 yards.—*G. rivale*. Wye Valley up to 300 yards.

Cratægus Oxyacantha. Common up to 450 yards.

Pyrus Aucuparia. Ascends to 500 yards. — *P. Malus*. Limestone dales up to 300 yards.

Epilobium hirsutum. Common up to 400 yards.—*E. parviflorum*. Wye Valley up to 250 yards. — *E. montanum*. Common up to 350 yards. — *E. obscurum*. Swamps up to 500 yards on Axe Edge. — *E. palustre*. Swamps up to 450 yards in Goyt's Clough.

Circæa lutetiana. Wye Valley up to Chee Tor, 250 yards.

Callitriche platycarpa. Swamps up to 500 yards on the slope of Axe Edge.

Ribes Grossularia. Not truly wild.

Sedum Telephium. Limestone cliffs, Taddington Wood, Millers Dale, Chee Tor, &c., 200–300 yards. — *S. acre*. Limestone cliffs, common up to 400 yards.

Saxifraga tridactylites. Walls up to 300 yards. — *S. granulata*. Dry banks up to 350 yards.—*S. hypnoides*. Ashwood Dale, Millers Dale, Winnats at Castleton, 250–350 yards.

Chrysosplenium oppositifolium. Swamps up to 450 yards in Goyt's Clough.

Parnassia palustris. Limestone banks up to 400 yards.

Helosciadium nodiflorum. Wye Valley up to Ashwood Dale, 300 yards.

Pimpinella Saxifraga. Limestone banks up to 400 yards at Peveril Castle, over Castleton.—*P. magna*. Abundant in Ashwood Dale, at the Lover's Leap, up to 350 yards.

Œnanthe. None seen.

Angelica sylvestris. Woods up to 400 yards.

Heracleum Sphondylium. Common up to 500 yards.

Torilis Anthriscus. Common on the limestone banks up to 350 yards.

Chærophyllum sylvestre. Common up to 400 yards.—*C. temulum.* Frequent, ascending to 400 yards over Castleton.

Myrrhis odorata. Tideswell, Burbage, and roadside near the Ebbing and Flowing Well; always near houses, 200–400 yards

Hedera Helix. Common on limestone cliffs up to 400 yards. A variety with deeply palmatifid leaves on the walls of Peveril Castle.

Cornus sanguinea. Truly wild in the limestone dales up to 350 yards.

Sambucus nigra. Wye Valley up to 300 yards.

Viburnum Opulus. Wye Valley up to Chee Tor, 250 yards.

Galium Cruciata. Common up to 400 yards on Fairfield Moor. —*G. verum.* Common up to 400 yards over Castleton. — *G. saxatile.* Ascends to the peak of Axe Edge over 550 yards.—*G. sylvestre.* Common on the limestone cliffs and banks, ascending to 400 yards at Peveril Castle. — *G. palustre.* Swamps up to 500 yards on Axe Edge.—*G. Aparine.* Common up to 450 yards.

Asperula odorata. Wye Valley up to Chee Tor, 250 yards.

Valeriana officinalis. Common in damp woods up to 350 yards.

Scabiosa Succisa. Frequent up to 400 yards.—*S. Columbaria.* One of the commonest plants of the limestone cliffs up to 400 yards.—*S. arvensis.* Common up to 400 yards; a weed in the highest corn-fields.

Carduus nutans. Common up to 500 yards, especially on limestone. — *C. crispus.* Ascends to 400 yards over Castleton. — *C. lanceolatus.* Common up to 500 yards.—*C. heterophyllus.* Limestone banks; mixed with *Parnassia* at Burbage, and in Monsal Dale, 200–400 yards.—*C. arvensis.* Common up to 500 yards.

Carlina vulgaris. Limestone banks, common, from Monsal Dale to 400 yards at Burbage.

Arctium minus. Millers Dale and Monsal Dale, not plentiful, up to 250 yards.

Centaurea nigra. Common up to 450 yards in Goyt's Clough. —*C. Scabiosa.* Limestone cliffs, common up to 350 yards.

Matricaria Parthenium. Quarry at Tideswell; an escape.

Chrysanthemum Leucanthemum. Common up to 450 yards in Goyt's Clough.

Anthemis arvensis. Roadside in Millers Dale, 250 yards.

Achillea Millefolium. Common up to 500 yards.—*A. Ptarmica.* Up to 450 yards in Goyt's Clough.

Filago. None seen.

Gnaphalium uliginosum. Up to 400 yards on Fairfield Common.

Senecio vulgaris. An abundant weed up to 450 yards. — *S. Jacobæa.* Common up to 500 yards.

Inula Conyza. Limestone cliffs in Millers Dale, 250 yards.— *I. dysenterica.* Wye Valley, up to foot of Chee Tor, 250 yards.

Bellis perennis. Common up to 500 yards.

Solidago Virgaurea. Cliffs both of lime and gritstone up to 450 yards in Goyt's Clough.

Tussilago Farfara. Common up to 500 yards,

Petasites vulgaris. Abundant in Wye Valley up to Buxton, 300 yards.

Eupatorium cannabinum. Wye Valley up to 250 yards.

Lapsana communis. Frequent up to 400 yards over Castleton.

Hypochæris radicata. Frequent up to 400 yards at Burbage.

Leontodon hispidus. Common up to 400 yards.—*L. autumnalis*. Common up to 500 yards on Axe Edge.

Picris hieracioides. Ashwood Dale and Taddington Wood, 200–300 yards.

Taraxacum officinale. Common up to 500 yards.—*T. palustre*. Up to 500 yards in swamps of Axe Edge.

Lactuca muralis. Common on limestone cliffs up to 400 yards over Castleton.

Sonchus oleraceus. Common up to 350 yards.—*S. asper*. Common up to 350 yards.

Crepis virens. Common up to 450 yards.—*C. paludosa*. Wye Valley up to Buxton, 300 yards.

Hieracium Pilosella. Common up to 500 yards. — *H. cæsium*. Limestone cliffs of Ashwood Dale, 300–350 yards. — *H. vulgatum*. Cliffs both of limestone and gritstone, ascending to 450 yards in Goyt's Clough.—*H. boreale*. Frequent in the limestone dales up to 300 yards.

Campanula latifolia. Limestone dales ; Castleton, Taddington, &c., 200–300 yards.—*C. rotundifolia*. Common up to 500 yards on Axe Edge.

Vaccinium Vitis-idæa. Plentiful on Axe Edge, 400–550 yards. —*V. Myrtillus*. Ascends to peak of Axe Edge, over 550 yards.

Erica Tetralix. Ascends to peak of Axe Edge, over 550 yards. —*E. cinerea*. None seen.

Calluna vulgaris. Abundant on the gritstone moors up to over 550 yards.

Fraxinus excelsior. Common and truly wild up to 450 yards.

Ligustrum vulgare. Native on limestone cliffs in Monsal Dale and Millers Dale, 200–250 yards.

Gentiana Amarella. Frequent up to 500 yards.—*G. campestris*. Frequent up to 500 yards.

Menyanthes. None seen.

Convolvulus sepium. A very frequent weed up to 400 yards at Burbage and Fairfield; grown round the house-porches at Taddington.—*C. arvensis*. Not seen.

Solanum Dulcamara. Millers Dale, 250 yards.

Scrophularia Balbisii. Wye banks in Monsal Dale, 200 yards. —*S. nodosa*. Common up to 400 yards over Castleton.

Digitalis purpurea. Up to 500 yards on Axe Edge.

Linaria Cymbalaria. Walls at Ashford, &c. ; alien.

Veronica agrestis. A weed up to 250 yards.—*V. arvensis*. Frequent up to 400 yards on limestone cliffs over Castleton. — *V. serpyllifolia*. Up to 350 yards. — *V. Chamædrys*. Common up

to 500 yards. — *V. montana.* Chee Tor Woods, 250 yards. — *V. Anagallis.* Ascends Wye Valley to 350 yards. — *V. Beccabunga.* Common in swamps up to 500 yards.

Euphrasia officinalis. Common up to 500 yards.

Bartsia Odontites. Wye Valley up to foot of Chee Tor, 250 yards.

Rhinanthus Crista-galli. Common up to 500 yards.

Mentha hirsuta. Wye Valley up to 350 yards. — *M. sativa.* By the Wye in Millers Dale, 250 yards.—Var. *paludosa* with the type in Monsal Dale.

Thymus Serpyllum. Common up to 500 yards.

Origanum vulgare. Common in the limestone dales, ascending to 400 yards at Peveril Castle.

Calamintha Clinopodium. Limestone dales up to 350 yards.

Nepeta Glechoma. Common up to 450 yards near cottages over Burbage.

Prunella vulgaris. Common up to 500 yards.

Stachys sylvatica. Common in woods up to 400 yards near Waterloo Inn.

Galeopsis Ladanum. A common weed up to the highest corn-fields, 450 yards.

Lamium incisum. A garden weed at Burbage, 350 yards.—*L. purpureum.* Common up to 400 yards.—*L. album.* Wye Valley up to Tideswell, 250 yards.

Ajuga reptans. Frequent up to 300 yards.

Teucrium Scorodonia. Common amongst the limestone cliffs up to 400 yards over Castleton.

Myosotis cæspitosa. Swamps of Axe Edge up to 500 yards.—*M. palustris.* Fine in Wye Valley up to Millers Dale, 250 yards.—*M. arvensis.* Common up to 400 yards.—*M. collina.* Limestone cliffs of Millers Dale, &c., 200–300 yards.

Primula vulgaris. Limestone cliffs up to 350 yards.

Anagallis arvensis. Only seen near Rowsley, 200 yards.

Plantago major. Common up to 500 yards.—*P. media.* Limestone banks up to 350 yds.—*P. lanceolata.* Common up to 500 yds.

Chenopodium album. Not seen.—*C. Bonus-Henricus.* Up to 350 yards at Taddington.

Atriplex angustifolia. Millers Dale, 250 yards.—*A. Smithii.* Up to highest corn-fields over Burbage, 450 yards.

Rumex nemorosus. Wye Valley up to Chee Tor, 250 yards.—*R. obtusifolius.* Common up to 500 yards.—*R. crispus.* Common up to 450 yards.—*R. Acetosa* and *R. Acetosella.* Ascend to peak of Axe Edge, over 550 yards.

Polygonum Convolvulus and *P. aviculare.* Ascend to highest corn-fields over Burbage, 450 yards.—*P. Persicaria.* Frequent up to 450 yards.—*P. amphibium.* Wye Valley at Ashford, 200 yards.—*P. Bistorta.* Meadow near the Grammar School at Buxton, 350 yards.

Empetrum nigrum. Abundant on Axe Edge, up to the peak, over 550 yards.

Euphorbia Peplus. A common weed up to 400 yards.

Mercurialis perennis. Common in the woods up to 350 yards.

Parietaria diffusa. Walls of Haddon Hall, 200 yards.

Urtica dioica. Common up to 500 yards.—*U. urens.* Not seen.
Ulmus suberosa. Lower part of Wye Valley; doubtfully native.—*U. montana.* Common up to 500 yards; plentiful in the limestone woods.
Quercus Robur. Woods up to 400 yards.
Castanea vulgaris. Chatsworth Park; planted.
Fagus sylvatica. Woods up to 400 yards.
Corylus Avellana. Common up to 400 yards.
Alnus glutinosa. Up the Wye Valley to Buxton, 300 yards.
Betula alba. Woods up to 400 yards.
Myrica Gale. Not seen.
Populus alba. Wild-looking by the Wye below Chee Tor, 250 yards.—*P. tremula.* Gritstone cliffs in Goyt's Clough, 450 yards.—*P. nigra.* Wye Valley up to Ashwood Dale, 300 yards; likely planted.
Salix pentandra. Not seen.—*S. fragilis.* Wye Valley up to Buxton, 300 yards.—*S. vitellina.* By the Wye near Monsal Dale Station, 250 yards.—*S. triandra.* Wye bank in Millers Dale, 250 yards.—*S. purpurea*, *S. viminalis*, and *S. Smithiana.* By the Wye up to Ashwood Dale, 300 yards.—*S. cinerea.* Common up to 500 yards on moor near the Cat and Fiddle Inn.—*S. aurita.* Swamps near the Cat and Fiddle Inn, 500 yards.—*S. Caprea.* Common up to 450 yards in Goyt's Clough.—*S. repens.* Not seen.
Pinus sylvestris. Planted up to 500 yards.
Juniperus communis. Limestone cliffs in Ashwood Dale, 550 yds.
Sparganium ramosum. Ponds up to 400 yards.
Lemna minor. Ponds up to 400 yards.
Potamogeton natans (true). Ponds up to 400 yards.
Triglochin palustre. Swamps up to 550 yards on Axe Edge.
Listera ovata. Woods over Burbage, 400 yards.
Scilla nutans. Monsal Dale up to 250 yards.
Narthecium ossifragum. Swamps on the moors round Cat and Fiddle Inn, 500 yards.
Luzula sylvatica. Goyt's Clough, 400 yards.—*L. multiflora.* Ascends to peak of Axe Edge, over 550 yards.
Juncus conglomeratus. Millers Dale, 250 yards.—*J. effusus.* Common up to 550 yards.—*J. glaucus* and *J. lamprocarpus.* Common up to 500 yards.—*J. supinus.* Moorland swamps of Goyt's Clough and Axe Edge up to 500 yards.—*J, bufonius.* Common up to 450 yards.—*J. squarrosus.* Ascends to peak of Axe Edge, over 550 yards.
Blysmus compressis. By the Wye below Chee Tor, 250 yards.
Scirpus palustris. Ponds up to 400 yards.—*S. cæspitosus.* Abundant on Axe Edge up to over 550 yards.—*S. setaceus.* Wye Valley up to 250 yards.
Eriophorum angustifolium. Moorland swamps up to over 550 yards on Axe Edge.—*E. vaginatum.* Moorland swamps up to over 550 yards on Axe Edge.
Carex pulicaris, C. stellulata, C. curta, C. ovalis, C. vulgaris, C. panicea, and *C. flava.* Swamps up to 500 yards.—*C. glauca.* Swamps up to 550 yards on Axe Edge.—*C. sylvatica.* Wye Valley

below Chee Tor, 250 yards.—*C. ampullacea.* By the Wye up to the foot of Chee Tor, 250 yards.

Anthoxanthum odoratum. Common up to the peak of Axe Edge, over 550 yards.

Digraphis arundinacea. Wye Valley up to 300 yards.

Alopecurus geniculatus. Swamps up to 500 yards.—*A. pratensis.* Common up to 500 yards.

Phleum pratense. Common up to 450 yards.

Agrostis canina. Swamps near Cat and Fiddle Inn, 500 yards. —*A. vulgaris.* Ascends on Axe Edge, over 550 yards.

Phragmites communis. By the Wye in Monsal Dale, 200 yards.

Aira cæspitosa. Common up to 500 yards. — *A. flexuosa.* Ascends above 550 yards on Axe Edge.—*A. caryophyllea.* Foot of Chee Tor, 250 yards.

Avena flavescens and *A. elatior.* Common up to 400 yards.— *A. pratensis.* Common amongst the limestone cliffs, 200–400 yards.

Holcus mollis and *H. lanatus.* Common up to 500 yards.

Triodia decumbens. Limestone banks at foot of Chee Tor, 250 yds.

Molinia cærulea. Moorland swamps near Cat and Fiddle Inn, 500 yards.

Melica uniflora. Woods up to 300 yards.

Glyceria fluitans and *G. plicata.* Common up to 500 yards.

Sclerochloa rigida. Wall near Monsal Dale Railway Station, 250 yards.

Poa annua. Ascends to Axe Edge, over 550 yards. — *P. nemoralis.* Limestone rocks and walls, Haddon, Millers Dale, Ashwood Dale, &c., 200–350 yards.—*P. pratensis.* Common up to 500 yards. — Var. *subcærulea.* Common on limestone cliffs and walls.—*P. trivialis.* Common up to 450 yards.

Briza media, *Cynosurus cristatus*, and *Dactylis glomerata.* Common up to 500 yards.

Festuca ovina. Ascends over 550 yards on Axe Edge. — *F. duriuscula.* Frequent up to 500 yards.—*F. elatior.* Taddington Wood, 250 yards.—*F. pratensis.* Common up to 500 yards.

Bromus giganteus. Wye Valley up to Buxton, 300 yards.—*B. asper.* Wye Valley up to Buxton, 300 yards,—*B. sterilis.* Ascends to 400 yards on limestone rocks over Castleton.—*B. mollis.* Common up to 500 yards.

Brachypodium sylvaticum. Common in woods up to 350 yards.

Triticum caninum. Common in the limestone woods up to Buxton, 350 yards.—*T. repens.* Common up to 400 yards.

Lolium perenne. Common up to 500 yards.

Nardus stricta. Ascends over 550 yards on Axe Edge.

Pteris aquilina. Ascends to 550 yards on Axe Edge, just meeting the *Rubus Chamæmorus.*

Lomaria Spicant. Ascends to 550 yards on Axe Edge.

Asplenium Ruta-muraria. Limestone cliffs, ascending to 400 yds. over Castleton.—*A. Trichomanes.* Taddington Wood, 250 yards.

Athyrium Filix-fœmina. Ascends to 550 yards on Axe Edge.

Cystopteris fragilis. Limestone cliffs over Castleton, 400 yards.

Nephrodium Filix-mas. Ascends to 450 yards in Goyt's Clough.

—*N. dilatatum.* Ascends to peak of Axe Edge, over 550 yards.—*N. Oreopteris.* Ascends with *Pteris* and *Filix-fœmina* to 550 yards on Axe Edge.

Polypodium vulgare. Limestone cliffs up to 300 yards.—*P. Robertianum.* Limestone cliffs, Tapley Pike and below Chee Tor, 250–350 yards.

Equisetum arvense. Common up to 450 yards.—*E. palustre* and *E. limosum.* Swamps up to 500 yards.

CYPERACEÆ NOVÆ.

By Henry N. Ridley, M.A., F.L.S.*

Cyperus divulsus.—Cæspitosa, glaucescens, radicibus fibrosis, culmis debilibus triquetris striatis semipedalibus foliis anguste linearibus acuminatis erectis, culmis brevioribus, vaginis integris, spiculis remotis tribus lanceolatis obtusis bracteatis, bracteis linearibus erectis squamis ovatis breviter mucronatis dorso viridescente, lateribus fulvo-brunneis lucidis marginibus anguste scariosis, racheola tetraquetra subflexuosa, foveolis angustis oblongis, stylo tenerrimo bifido brevissime exserto, caryopsi subglobosa atra rugosa brevissime apiculata, squama dimidio breviore.

Madagascar, in paludibus Betsileo, No. 4080, Hildebrandt.

A remarkable plant of the Pycreus section, allied to *C. intermedius* Steud., with the spikelets arranged in a spike, quite distinct from each other, each being subtended by its bract, instead of forming an umbel with a whorl of bracts, as is almost universal in the genus. Specimens of *C. intermedius* Steud., and *C. stramineus* Nees, do rarely show signs of this elongation of the axis of the umbel but in a very much less degree. The bracts are long, narrow, and erect, overtopping the spike. The nut is subglobose, dull black, and remarkably rugose, like that of some Scleriæ. The culms are about 6 in. in height, the longest of the bracts is 3 in. in length, the spikelets ½ an in.

C. Smithianus.—Subpedalis rigidus, glaucus, radicibus lanatis, culmis triquetris basi bulbosis foliis linearibus acuminatis pluribus culmo brevioribus, vaginis membranaceis striatis, involucralibus 4 linearibus, acuminatis patentibus spiculis linearibus oblongis albis congestis, squamis ovatis obtusis tricostatis ecarinatis albis, dorso obscure sanguineo-punctata, racheola recta, tetraquetra, foveolis oblongis, stylo trifido brunneo, longe exserto, caryopsi minutissima oblongo-ovata obscure trigona breviter apiculata cancellata flavescente.

Congo River, Christian Smith.

A rigid, apparently ammophilous plant, with bulbous culms, 9 in. in height; numerous stiff leaves, 7 in. long; and four

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* The species described and referred to in this paper are in the Herbarium of the British Museum.

spreading involucral leaves, 4 in. in length. The spikelets are crowded together into a loose head; they are white, and ½ an in. in length. The glumes (1 line long) are rather broad, and three-ribbed; the ribs rather distant. The nut is very small, but is not quite ripe. The affinity of the plant is with *C. proteinolepis*.

C. albiceps. — Humilis, culmo singulo, triunciali triquetro basi bulboso, radicibus fibrosis foliis pluribus glaucis culmum superantibus, late-lineari-acuminatis, marginibus et carina scabris, involucralibus 4 patentibus vel reflexis linearibus acuminatis glaucis basi vix dilatatis, capitulo singulo ovato, spiculis compressis quadrifloris parvis, squamis lanceolatis acuminatis acumine recurvo, multistriatis dorso albo marginibus scariosis stylo trifido longiusculo brunnescente exserto caryopsi (immatura) oblonga triquetra.

Congo, Christian Smith.

A small plant, with the habit of a Kyllinga, 3 in. in height, with stiff glaucous leaves, and a small ovate white capitulum, ⅓ of an in. in length. The spikelets are very small and flattened, 2 lines long, and closely packed together; somewhat resembling those of *C. leucocephalus* Retz.

C. daphænus.—Cæspitosa, culmis erectis subbulbosi spluri-foliatis erectis acute-triquetris sulcatis subpedalibus, foliis longe-vaginatis anguste linearibus flaccidis culmos superantibus, vaginis integris ore scariosis sanguineo-punctatis, involucralibus 4 linearibus reflexis uno longissimo apice scabridis, spicis 3, arcte congestis sessilibus, spiculis lanceolatis-ellipticis turgidulis parvis quadrifloris, squamis inferioribus ovatis, superioribus lanceolatis carinatis 14 costatis, carina viridi lateribus fulvis sanguineo-punctatis, stylo pallido profunde trifido complanato parum exserto caryopsi (immatura) oblonga triquetra.

Madagascar, Hilsenberg & Bojer.

The affinity of this plant is with *C. flavus* Bckler non Presl (*Mariscus flavus* Vahl.), from which it is distinguished by its small ovate capitulum, little spikelets, and very long scarious vaginæ, like those of *C. dubius* Rottb., of which it has much the habit. The culms are 9 in. in height; the vaginæ 4 in. long; longest involucral bract, 4 in.

The following Cyperi occur in Madagascar, but are not included in Mr. C. B. Clarke's list in vol. xx. of the 'Journal of the Linnean Society':—*C. dichrostachys* Hochst., Ankafina, South Betsileo, Hildebrandt, No. 4016, a native also of Lower Guinea and Abyssinia; and *C. margaritaceus* Vahl., Madagascar, Thompson, also a tropical African plant. *C. nudicaulis* Poir., not seen by Mr. Clarke from Madagascar, was collected by Hildebrandt at Andrangvloaka (No. 3741).

Scleria Hilsenbergii.—Culmis debilibus triquetris paucifoliatis ultra pedalibus, foliis viridibus flaccidis linearibus marginibus apicium ciliatis panicula laxa, ramis capillaribus subflexuosis fasciculis remotis sessilibus ad viginti, bracteis ovatis longe mucronatis, quam fasciculos brevioribus, mucrone ciliato spiculis binis vel ternis, parvis masculis femineisque commixtis,

squamis inferioribus ovatis lanceolatis mucronibus longis, superioribus lanceolatis acuminatis mucronatis ferrugineis sanguineo-lineolatis dorso viridi, caryopsi globosa trigona breviter apiculata, tuberculosa, alba, basi angustata trigona.

Madagascar, Hilsenberg & Bojer.

This plant is allied to *S. verticillata* Sw. The culms are 14 in. in height; the leaves shorter, rather narrow, 1 line in diameter; the branches of the panicle very slender, and longer than in *verticillata*; and the spikelets are longer and narrower. The rhizome is absent in both specimens.

ON THE FLORA OF SOUTH LINCOLNSHIRE.

By W. H. Beeby.

The following notes are the result of a stay of eight days at St. James Deeping, South Lincolnshire, at the end of July and beginning of August last. The area investigated was small, comprising only the immediate neighbourhood of Deeping, the course of the River Welland from Deeping to Crowland, and that portion of Deeping Fen which is enclosed by the North Drove, South Drove, and Cross Drains, as far northward as Littleworth. The soil about Deeping and the western part of the Fen is chiefly gravel, but round Littleworth and about the South Drove Drain a clayey soil prevails. The drainage of the Fen was first attempted in the reign of Henry I. "This work, considering the times, was a success, for, although many lakes and sykes remained, the general surface was sufficiently drained to ensure a pretty certain crop to the husbandman, which was by no means the case before." * This, the first to be drained, is now a Fen only in name, and arable lands and drains alternate throughout, the prospect unbroken by broad, or mere, or even bog. Thus none of the rare fen plants are to be found, and observations are restricted to corn-field plants and aquatics. Attention was chiefly given to the latter.

The number of species noted was about 300, of which (besides the *Beta*, two doubtful pond-weeds, and five *Characeæ*) 26 are unrecorded for South Lincolnshire in Top. Bot., ed. 2. Some addition to this number would doubtless have resulted had investigations been pushed in the direction of Baston, on the gravel, and had the corn-field plants been more closely studied. A few hours spent at Sutton Bridge and the adjoining coast produced nothing of special interest, *Beta maritima* L. being the only addition to the vice-county from that neighbourhood.

It will be borne in mind that remarks as to the rarity, &c., of the several plants refer to the area above defined, and not to the vice-county generally. Those species which are new to South Lincolnshire are marked with * in the following list, which includes

* 'The Fenland, Past and Present.' By S. J. Miller and S. B. J. Skertchly.

those plants which seem worthy of notice, on account of their rarity or the contrary.

Thalictrum flavum L. Rare; leaves only, by the South Drove Drain. Sparingly in fruit by the Cross Drain. The latter I believe var. *riparium* Jord.

**Ranunculus trichophyllus* Chaix. Plentiful in a ditch by the roadside at Littleworth. "I think your *Ranunculus* from Littleworth is *trichophyllus*," Prof. Babington. —*R. sceleratus* L. About Deeping; not common. — *R. Lingua* L. Only seen sparingly in a piece of fenny ground adjoining the railway between Deeping and Littleworth. — *R. acris* L., and *R. repens* L., both frequent; *R. bulbosus* not noted.—*R. arvensis* L. Corn-fields, Deeping and Deeping Fen.

Nymphæa alba L. Rare; sparingly in the South Drove Drain. Mr. Thompson's fish-pond, Deeping. Introduced at the latter station; roots from Eastbourne.

Papaver Rhæas L. Corn-fields in the Fen; not abundant.—*P. dubium* L. Near the railway, Deeping. This is the var. *Lamottei*. Perhaps *P. Lecoqii* occurs in a corn-field between Littleworth and the South Drove Drain; sap yellow, but capsule scarcely satisfactory.—*P. Argemone* L. Sparingly about Deeping.

**Sinapis alba* L. Waste ground at Deeping. — *S. nigra* L. By the River Welland, Crowland.

Sisymbrium officinale Scop. Only seen at Crowland.—*S. Alliaria* not observed.

Erysimum cheiranthoides L. Waste ground near Deeping; not seen in the Fen.

Nasturtium sylvestre Brown. By drains about Crowland. — *N. amphibium* Brown. River Welland below Deeping.

Stellaria aquatica Scop. Noted. — *S. graminea* L. Only once seen, by the roadside between Deeping and the Cross Drain.

Sagina nodosa Meyer. At the junction of the South Drove and Cross Drains.

Hypericum tetrapterum Fries. Not very abundant, and the only species noted.

Malva sylvestris and *M. rotundifolia* L. Both about Deeping and Crowland; neither very plentiful.

Linum catharticum L. By the Cross Drain, towards Baston.

Geranium pusillum Burm., *G. dissectum* L., *G. molle*, L. All rather frequent, but nowhere abundant.—*G. Robertianum* L. Deeping.

**Ononis arvensis* Auct. Roadside from Deeping to Stamford.

Trifolium minus Relh., and *T. procumbens* L. Not seen, except at Sutton Bridge.

Sanguisorba officinalis L. Not unfrequent in damp ditches between Deeping and the Fen.

Rosa canina L., var. *dumalis*. Hedges near Deeping in several places. The only form observed.

Pyrus Malus L., var. *mitis*. Hedges of fields near Deeping.

**Epilobium tetragonum* L. Ditches between Deeping and the railway.

Myriophyllum verticillatum L. Only seen in Mr. Thompson's fish-pond, Deeping. — * *M. spicatum* L. With the above and generally common. — * *M. alterniflorum* DC. Noted, and I think common.

Hippuris vulgaris L. Very common in drains, &c.

**Callitriche obtusangula* Le Gall. — The common species of the district. — *C. stagnalis* Scop. (aggr.). Much less common than the last. No other species was seen in fruit.

Sedum acre L. Walls at Deeping, and dry banks by the River Welland towards Crowland.

Sempervivum tectorum L. Cottage roofs at Deeping.

Pimpinella Saxifraga L. Only seen in one place by the Cross Drain.

Sium latifolium L. Rather frequent in the Fen about Littleworth; more so about Crowland.

Œnanthe Phellandrium L. Rather common. — **Œ. fluviatilis* Colem. River Welland below Deeping. I record this, without much hesitation, from its habit alone, having omitted to examine the plant.

Pastinaca sativa L. Railway banks near Deeping. Introduced?

Torilis nodosa Gaert. Dry banks by the River Welland, near Crowland.

Conium maculatum L. Frequent, and attaining a large size.

Galium verum L. Deeping.—*G. palustre* L. Common.

Sherardia arvensis L. Corn-field near Deeping.

Valerianella dentata Koch. Littleworth.

Scabiosa arvensis L. Only seen by the road from Deeping to Stamford.

Carduus nutans L. Rather frequent.—*C. crispus* L. Banks of South Drove and Cross Drains.—*C. palustris* L. Only seen in one place by the Cross Drain.

Arctium majus Schk. Rather frequent in the Fen by the roadside from Deeping to Crowland. Another plant seen near the Cross Drain is perhaps the var. *subtomentosum* Lange.

Filago germanica L. Sparingly by the Cross Drain.

Gnaphalium uliginosum L. Almost absent, although looked for everywhere in the expectation of finding var. *pilulare*. Only two plants were seen—in the Fen near Littleworth.

Senecio sylvaticus L. Littleworth.

Petasites vulgaris L. Abundant by the River Welland, at Market Deeping.

Tussilago Farfara L. Only seen by the road from Deeping towards Baston.

Leontodon hirtus L. Littleworth.—*L. autumnalis* L. Common about Deeping, &c. Very variable.

Helminthia echioides Gaert. By the road from Deeping to Baston.

Tragopogon pratensis L. Not in flower; apparently var. *minor*. Only seen by the River Welland near Crowland.

**Taraxacum officinale* L., var. *lævigatum*. On walls at Deeping St. James.

Sonchus arvensis L. The Fen plant is noticeable on account of its copiously-branched stem and deeply-cut leaves.

**Crepis biennis* L. A rather common plant in hedge-banks and grassy places by roadsides about Deeping.

Verbascum Thapsus L. Only seen in cottage gardens at Deeping.

Veronica hederifolia, *V. polita*, *V. agrestis*, *V. arvensis*, *V. Chamædrys* L. All noted about Deeping. — *V. Anagallis* and *V. Beccabunga* L. By the River Welland, below Deeping.

Lycopus europæus L. Deeping; not common.

Mentha sativa L. Pits in a field near Deeping Station.

Galeopsis versicolor Curt. Plentiful in corn-fields.

Myosotis palustris With. The only one of the aquatic species observed.

Utricularia vulgaris L. Rather plentiful in the Cross and South Drove Drains. Only one specimen seen in flower.

Hottonia vulgaris L. Deeping, Crowland, &c.

Plantago media L. In one place by the roadside towards Baston.

Chenopodium rubrum L. Deeping. — *C. Bonus-Henricus* L. Crowland.

**Rumex maximus* Schreb. River Welland, between Deeping and Crowland. Not in ripe fruit, but the strongly-cordate leaves and furrowed petiole leave no doubt as to the species. New to Watson's Province VIII. Queried for North Essex in Top. Bot.

Parietaria diffusa Koch. Deeping.

**Ulmus montana* Sm. Littleworth. Planted?

Typha latifolia L., var. *media*. In several places by the South Drove Drain, near Littleworth.

Sparganium ramosum Huds. Crowland, &c. — *S. simplex* Huds. Littleworth.

Lemna trisulca and *L. polyrhiza* L. Both abundant in drains near Crowland.

Potamogeton natans L. Rather common. — *P. oblongus* Pour. Certainly rare; I think once seen in the Fen near Littleworth.— *P. heterophyllus* Schreb. Will probably be found in the North Drove Drain, which had been recently "roaded," so that the plants were not determinable. — *P. Zizii* M. & K.? North Drove Drain; Drain near Crowland. On these plants Mr. Arthur Bennett remarks, "I feel pretty sure *P. Zizii*, but it is hardly safe to assume them to be so on account of the state of the specimens." These drains had been recently roaded.—*P. lucens* L. Very common, with var. *acuminatus* E. B. A curious form with obovate leaves occurs in the River Welland. — **P. decipiens* Nolte. Sparingly in the North Drove Drain. "Yes; not the Swedish or Holstein form, but that of Silesia," Arthur Bennett. — *P. densus* L. Very common; more so than *P. crispus*.—**P. pusillus* L. Frequent, with var. *tenuissimus*.

Zannichellia palustris* L. Deeping.—Z. pedicillata* Fries. Plentiful in a drain by the roadside at Littleworth.

Triglochin palustre L. By the North Drove Drain.

Alisma lanceolata With. Frequent.—*A. ranunculoides* L. South Drove and Cross Drains.

Butomus umbellatus L. Crowland, Deeping, &c.

**Hydrocharis Morsus-ranæ* L. In several drains near Crowland.

Iris Pseud-Acorus L. In fruit by Mr. Thompson's fish-pond, Deeping. Native (*fide* keeper).

Juncus obtusiflorus* Ehrh. Fenny ground by the railway betweeu Deeping and Littleworth. Plentiful in the Cross Drain.—*J. acutiflorus* was not seen.—J. compressus* Jacq. Somewhat sparingly in one place by the Cross Drain. Possibly hidden in other places by the longer herbage.

Scirpus aicularis* L. Abundant in the larger drains, but not seen in flower or fruit.—S. palustris* L. Deeping, Littleworth, &c. —*S. lacustris* L. Deeping.

Carex disticha* Huds. Rather frequent in wet ditches, &c., about Deeping, and towards the railway-station.— *C. vulpina* L. The commonest species. — *C. muricata* L. Very fine by the River Welland, near Crowland; not seen elsewhere. — **C. flava* L. Sparingly by the North Drove Drain. Plant stunted.—C. hirta* L. Deeping, "&c." — *C. Pseudo-cyperus* L. Ditches by several roads leading from Deeping towards Baston.—*C. riparia* Curt. Rather abundant in one place by the Cross Drain, towards Baston.

Agrostis alba L., var. *stolonifera*. Common in the Fen.

Sclerochloa rigida Link. Walls and dry places about Deeping.

Phragmites communis L. In the Cross Drain, with stolons 15 ft. long. Not observed to be stoloniferous elsewhere.

**Avena fatua* L,, var. *pilosissima*. Roadside near Deeping.

Briza media L. Deeping.

**Festuca elatior* L. Hedge-banks about Deeping.

Bromus giganteus L. Hedges about Deeping. — *B. commutatus* Schrad. Under the walls of Crowland Abbey. — *B. mollis* L. Crowland, &c.

Triticum repens L. Not so common as var. *barbatum* Duval-Jouve, which is the prevalent form.

Hordeum murinum L. Deeping.

Equisetum palustre and *E. arvense* L. Deeping.—*E. limosum* L. Crowland, and in several parts of the Fen.

Tolypella prolifera Leonh. See Journ. Bot. 1883, p. 280.

Chara vulgaris L. Frequent, but not abundant, except in a large pit by the railway near Deeping, A plant from a ditch near the railway-station has been named var. *longibracteata* by Messrs. Groves.—*C. hispida* L. Deeping, &c. Chiefly in the Cross Drain. —*C. aspera* Willd. The commonest species and the only one that is generally plentiful. Covering the bottoms of the larger drains for miles. — *C. fragilis* Desv., var. *Hedwigii*. Drain at Crowland. Mr. Thompson's fish-pond, near Deeping. Probably elsewhere, but easily passed over, as it occurs among dense growth of *Myriophyllum*, &c. The only specimens collected are referred to the above variety by the Messrs. Groves, to whom and to Mr. Arthur Bennett my thanks are due for their kindness in examining the *Characeæ* and *Potamogetons*. No *Characeæ* seem to have been hitherto recorded for South Lincolnshire.

In conclusion, I trust that these notes may be the means of interesting other botanists in the flora of the county, where much work evidently remains to be done.

A THIRD NEW CHINESE *RHODODENDRON*.

By H. F. Hance, Ph.D., F.L.S., &c.

My sharp-sighted and indefatigable friend, the Rev. B. C. Henry, made, during May last, in company with Captain Calder, of the Imperial Chinese Navy, an excursion to the Lo-fau-shan range, about forty miles north-east of Canton. These mountains, studded with monasteries, both Buddhist and Taoist, where the traveller can obtain shelter, form a series of plateaux whence arise peaks, some of them attaining a height of 3500 feet, nearly double that of Victoria Peak, the loftiest summit in Hong-Kong. The botanical specimens collected by Mr. Henry and others, some of which have already been described in these pages, leave no doubt in my mind that this locality is by far the richest and most interesting within accessible distance of the provincial capital. It is quite famous amongst Chinese Ῥιζοτόμοι, and I feel assured that its careful exploration would lead to the discovery of a large number of valuable and ornamental trees and shrubs, as well as herbaceous plants. I trust that the Kew authorities, in the interests of science, may induce the Colonial Office to arrange for this scarcely known but easily reached locality being systematically travelled over by Mr. Charles Ford, the Superintendent of the Botanical and Afforestation Department in Hong-Kong, assisted by a staff of gardeners. His practical knowledge would, I am sure, enable him to render great services both to botany and horticulture; and he could, I believe, readily make arrangements with some of the abbots for a steady transmission of living plants after his return. During this expedition Mr. Henry was so fortunate as to discover, in a single locality, on the verge of a deep and inaccessible precipitous ravine, thickly peopled by our remote cousins, and hence called Ma-lau-tung or "Monkey Gorge," situated on the small plateau of Ku-ye-toi, half a mile east of the Buddhist monastery, Put-wan-mun, at about 3200 feet above the sea-level, a very fine new *Rhododendron*, the third accession to the genus for which we are indebted to his untiring and most successful exertions. A constant cloud-like mist fills and rises from the gorge, and the trunk and branches of the shrub are overgrown with moss. The species, of which I subjoin a diagnosis, drawn up from excellent material, is near *R. arboreum* Linn. and its allies.

Rhododendron (Eurhododendron, subseries 4) **simiarum**, sp. nov.—Frutescens, 6–8 pedale, ramulis angulatis nodosis glaberrimis, foliis rigide coriaceis oblongis basi cuneatis apice obtusis margine revolutis supra glaberrimis olivaceis sublucidis costa tenuiter impressa venularum rete subconspicuo sed haud elevato subtus opacis

dense fulventibus v. albidis costa fortiter prominente nervis tenuibus venularum rete nunc nudato 3 poll. longis 10–12 lin. latis petiolo 4-lineali, gemmarum floriferarum ovoidearum squamis multiseriatis orbicularibus dorso tomento aureo sericeo vestitis margine ciliatis, floribus circ. 5 terminalibus corymbosis, pedicellis 3–8 lin. longis albo-pilosis, calyce parvo angusto leviter 5-dentato v. cupulari pilosulo, corollæ infundibulari-campanulatæ utrinque glaberrimæ roseolo-albæ intus pulchre purpureo punctatæ odoræ 14–15 lin. longæ sursum ampliatæ fere ad medium 5-lobæ lobis rotundatis, staminum 10 inæqualium dimidium v. duas tertias corollæ longitudinis adæquantium filamentis basi pilosis superne glaberrimis antheris glabris breviter oblongis apice poro duplici ovali dehiscentibus, ovario oblongo albo-villoso 6-loculari, stylo crassiusculo glabro corollæ æquilongo stigmate capitato lobulato, capsula breviter ellipsoidea recta obtusa 6 lin. longa basi calyce indurato discoideo cincta.

In jugi Lo-fau-shan, prov. Cantonensis, loco unico, Ma-lau-t'ung (h. e. "vallis arta et prærupta simiarum") dicto, nebulis semper obnoxio, sæpius muscis obvallatum sed lætissime florens, invenit scrutator oculeus rev. B. C. Henry, m. Maio 1883. (Herb. propr. n. 22205).

A SYNOPSIS OF THE GENUS *SELAGINELLA*.

By J. G. Baker, F.R.S., &c.

(Continued from vol. xxi., p. 336).

98. S. MARGINATA Spring Mon. ii. 211; Fl. Bras. i. 127, t. 7; *Lycopodium marginatum* H. B. K. — Stems trailing to a length of 2–3 ft., subterete, jointed at the nodes, copiously pinnate, with short copiously compound alternate branches. Leaves close on the branchlets, spaced on the stem, rather ascending, oblong-lanceolate, acute, 1-12th to 1-8th in. long, rather rigid in texture, nearly equal-sided, not imbricated over the stem, with a spur-like auricle from the base on the upper side, which is shortly ciliated; leaves of the upper plane one-third to one-half as long, oblique ovate, not cuspidate. Spikes $\frac{1}{4}$–$\frac{1}{3}$ in. long, square; bracts ovate-lanceolate, crowded, strongly keeled.

Hab. Guiana and Central Brazil. Humboldt's original specimen was gathered on the banks of the Orinoco, not in Mexico, as stated by Spring. A near ally of *S. stolonifera*.

99. **S. macroclada**, n. sp. — Stems entirely trailing, reaching a length of 2 ft. or more, jointed at the nodes, acutely angled on both back and face, excurrent at the end, furnished with numerous excurrent alternate pinnately arranged branches, with contiguous simple erecto-patent branchlets. Leaves of the lower plane close both on branches and branchlets, more or less ascending, lanceolate or oblong-lanceolate, acute, 1-12th to 1-8th in. long, moderately firm in texture, more produced on the upper side of the midrib, where they are rounded and shortly ciliated, slightly imbricated

over the stem, auricled at the base on the lower side; leaves of the upper plane one-half to one-third as long, oblique ovate, acute, much imbricated. Spikes not seen.

Hab. British Guiana, *Appun* 802! Well-marked from *stolonifera* and *marginata* by its plan of branching.

100. S. Pœppigiana Spring Mon. ii. 217, ex parte; *S. Martensii* Metten. in Lechler Fil. Peruv. No. 2015, non Spring; *Lycopodium Pœppigianum* Hook. & Grev., ex parte. — Stems trailing, 1–2 ft. long, forked at the base, jointed at the nodes, flat on the back, bisulcate on the face, copiously pinnate, with copiously compound erecto-patent branchlets. Leaves of the lower plane spaced except towards the tip of the branchlets, very much spaced on the main stem, spreading or rather ascending, oblong-lanceolate, subacute or subobtuse, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green and moderately firm in texture, more produced on the upper side of the midrib, broadly rounded on the upper side at the base, scarcely at all imbricated over the stem and not distinctly ciliated, not distinctly auricled on the lower side; leaves of the upper plane one-third as long, oblique oblong, with a distinct cusp. Spikes square, $\frac{1}{4}$–$\frac{1}{2}$ in. long, 1 lin. diam.; bracts ovate, acute, sharply keeled.

Hab. Andes, from New Granada to Peru.

101. S. Kunzeana A. Br. in Crypt. Nov. Gran. 380; *S. suavis & Pœppigiana* Spring, ex parte; *Lycopodium radiculosum* Kunze. — Stems trailing, a foot or more long, jointed at the nodes, flat on the back, bisulcate on the face, copiously pinnate, with copiously compound short erecto-patent branches. Leaves of the lower plane spaced even on the branchlets, ascending, lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green, moderately firm in texture, a little more produced on the upper side of the midrib, obscurely ciliated, rounded but not imbricated over the stem on the upper side at the base, distinctly auricled on the lower; leaves of the upper plane one-third as long, oblique ovate, cuspidate, imbricated. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{3}{4}$ lin. diam., square; bracts ovate-lanceolate, strongly keeled.

Hab. Andes, from New Granada to Peru. Very near *S. Pœppigiana*, from which it differs by its less unequal-sided leaves, distinctly auricled on the lower side at the base.

102. S. canescens Fée Fil. Bras. 99, t. 108, fig. 2. — Stems trailing, $\frac{1}{2}$ ft. long, flat on both back and face, pubescent, jointed at the nodes, copiously pinnate, with short flabellately compound cuneate branches. Leaves of the lower plane close on the branchlets, spaced on the main stem, oblong-lanceolate, acute, 1-12th to 1-8th in. long, more produced on the upper side of the midrib, broadly rounded, ciliated and imbricated over the rachis on the upper side at the base, not auricled on the lower; leaves of the upper plane one-half as long, ovate-lanceolate, minute, much imbricated. Spikes not seen.

Hab. Rio Janeiro, *Glaziou* 4489!

103 S. suavis Spring Mon. 216, ex parte; A. Br. in Crypt. Nov. Gran. 381.— *S. Glaziorii* Fée Fil. Bras. 232, tab. 75, fig. 4.— Stems trailing, a foot or more long, flat on the back, bisulcate on

the face, jointed at the nodes, copiously pinnate, with copiously compound short cuneate branches. Leaves of the lower plane close on the branchlets, spaced on the main stem, oblong-lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green and moderately firm in texture, more produced on the upper side of the midrib, broadly rounded and a little imbricated over the stem and shortly ciliated on the upper side at the base, distinctly auricled on the lower side; leaves of the upper plane a third as long, oblique ovate, with a long cusp, much imbricated. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, square, $\frac{3}{4}$–1 lin. diam.; bracts ovate-lanceolate, strongly keeled.

Hab. Rio Janeiro, *Glaziou* 4482! 4502!

104. S. SULCATA Spring Mon. ii. 214; *Lycopodium sulcatum* Desv; *L. marginatum* Gaudich; *L. plumosum* Vellozo Fl. Flum. xi. t. 113.—Stems trailing in the lower half, usually assurgent in the upper half, flat on the back, deeply bisulcate down the face, jointed at the nodes, copiously flabellato-pinnate, the final branchlets contiguous. Leaves of the lower plane close on the branchlets, spaced on the stem, oblong-lanceolate, acute or subacute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green, moderately firm in texture, rather more produced on the upper side of the midrib, auricled on both sides at the base, obscurely ciliated on the upper side, not distinctly imbricated over the stem; leaves of the upper plane a third as long, oblique ovate, with a long cusp. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, square, $\frac{1}{2}$–$\frac{3}{4}$ lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Common in South Brazil.

Var. *cruenta* Spring (*S. erythropus* Fée Fil. Bras. 230, non Spring) is a form with bright red stem and root-fibres. *S. Humboldtiana* A. Br. in Fil. Nov. Gran. 377, from the banks of the Orinoco, is said to differ from *sulcata* by its more flaccid texture, shorter base on the upper side of the leaves of the lower plane, and lower side with a longer auricle.

105. S. AFFINIS A. Br. in Crypt. Nov. Gran. 380; *S. Pœppigiana* var. *guyanensis* Spring Mon. 218; *S. rigida* Hort.—Stems a foot or more long, trailing, flat on the back, bisulcate on the face, jointed at the nodes, forked low down and copiously pinnate, with erecto-patent copiously compound branches. Leaves of the lower plane close on the branchlets, ascending, oblong-lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green, moderately firm in texture, a little more produced on the upper side of the midrib, hardly at all imbricated over the stem, not ciliated and not distinctly auricled on either side at the base; leaves of the upper plane a third as long, oblique oblong, cuspidate, imbricated. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, square, 1 lin. diam.; bracts ovate-cuspidate, strongly keeled.

Hab. Guiana. A close ally of *S. Pœppigiana* and *Kunzeana*. A rare species in cultivation.

106. **S. sylvatica**, n. sp.—Stems with the root-fibres confined to the lower half, about a foot long, jointed at the nodes, flat on the back, bisulcate on the face, copiously pinnate, with copiously compound erecto-patent branches. Leaves of the lower plane close only at the tip of the branchlets, the upper ascending, the lower patent, oblong-lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, almost membranous

in texture, more produced on the upper side of the midrib, conspicuously ciliated at the base, broadly rounded and imbricated over the stem on the upper side, slightly auricled on the lower; leaves of the upper plane a third as long, oblique oblong, with a long cusp. Spikes short, square, ½ lin. diam.; bracts ovate, strongly keeled.

Hab. In shady woods near the town of Panama, *Seemann* 31!

107. S. DIFFUSA Spring Mon. ii., 104; *Lycopodium diffusum* Presl.—Stems above a foot long, trailing, jointed at the nodes, flat on the back, sulcate on the face, copiously pinnate, the branches erecto-patent, the lower with 5–6 short branchlets. Leaves of the lower plane patent, ovate-deltoid, very acuminate, ⅛–⅙ in. long, rigid, bright green, conspicuously ciliated at the base, more produced on the upper side of the midrib, rounded at the base on the upper side, cordate and auricled on the lower; leaves of the upper plane a third as long, ovate-oblong, acuminate. Spikes short, square; bracts ovate-acuminate, strongly keeled.

Hab. Panama, *Hænke*.

108. S. EURYNOTA A. Br. in Crypt. Nov. Gran., 377.—Stems trailing, a foot or more long, jointed at the nodes, flat on the back, bisulcate on the face, copiously pinnate, the short erecto-patent branches copiously compound. Leaves of the lower plane spaced even on the branches, ascending on the branchlets, lanceolate, acute, ⅛–⅙ in. long, bright green and moderately firm in texture, nearly equal-sided, not distinctly auricled nor ciliated nor imbricated over the stem at the base; leaves of the upper plane a third as long, oblique ovate, with a short cusp. Spikes copious, square, ¼–½ in. long, ½ lin. diam.; bracts ovate-cuspidate, strongly keeled.

Hab. Costa Rica, *Hoffmann* 907! Guatemala, *Bernouilli* 33! Empire state, common in damp places, *Sutton Hayes* 228!

109. S. MNIOIDES A. Br. in Planch. and Trian. Crypt. Nov. Gran., 384; *S. ciliauricula* and *cirrhipes* Spring; *S. mnioides* Spring, ex parte; *Lycopodium mnioides* Sieber.—Stems entirely trailing, reaching 1–2 ft. in length, flat on the back, bisulcate on the face, forked low down and copiously pinnate, the ascending branches copiously compound. Leaves of the lower plane spaced even on the branchlets, very much so on the stem, spreading, ovate-oblong or oblong-lanceolate, subacute, 1-8th to 1-5th in. long, bright green, moderately firm in texture, more produced on the upper side of the distinct midrib, laterally attached, but slightly cordate and imbricated over the stem at the base, strongly ciliated and minutely auricled on both sides; leaves of the upper plane half as long, oblique ovate, acute, not cuspidate. Spikes ¼–½ in. long, square, ¾ lin. diam.; bracts ovate acute, strongly keeled.

Hab. West Indies and Andes of Venezuela, New Granada, Ecuador and Bolivia. The locality of Mauritius, given by Sieber for his type, is no doubt a mistake. *S. macrophylla* A. Br., loc. cit., from the Andes of Bolivia, seems to be a large luxuriant variety of this species.

(To be continued.)

SHORT NOTES.

Proterogyny in Erythræa capitata Willd.—Some observations which I have lately made on the opening flowers of *Erythræa capitata* Willd. var. *sphærocephala* Towns. seem worthy of record. I have had the plant under culture, raised from seed gathered at Freshwater, and I have been able to watch the growth of the flowers from day to day. At first the calyx-segments grow faster than the corolla, and in a very early stage considerably exceed the latter in length. After a while the corolla grows faster than the calyx, and, up to the time it has extended about one-eighth of an inch beyond the calyx tips, it remains closed, the tips of the petals meeting so closely that no opening between them is visible. But now another organ hurries its growth and steals a march upon the corolla. The tips of the petals are gradually forced away by the more rapid growth of the pistil, and the two flattened disks of the bifid stigma —up to this time pressed together face to face—separate, expand, and become exposed to view. Thus the plant is eminently proterogynous. Sometimes the stigma-disks protrude a little beyond the corolla, but they are always tightly surrounded by the petals, so as effectually to prevent access to the stamens. After a few days the state of things is again changed; the growth of the germen is arrested for a while, while that of the corolla continues, so that in a few days it completely redevelopes and encloses the germen, hides the stigma-disks, and affords protection to them and to the pollen, which has probably been brought to them by insect aid from a neighbouring flower; thus the period of gestation is one of peace. By the time the flower expands the stamens are ripe, and the pollen is fit to be carried to fecundate other flowers, but nature has already secured that it shall not fecundate its own flower. It should be noticed that the colour of the exterior surface of the petals is much brighter and deeper than that of the inner or upper surface, which is a wise provision, for insects are attracted to the unopened flowers of the brighter colour, though no honey is prepared for them, and hence the blossom is more certainly fecundated. Only a few flowers of the flowering tuft open at a time. I have not noticed whether this peculiar mode of flowering is common to other species of *Erythræa*.—Frederick Townsend.

Carex ligerica Gay in England.—In the autumn of 1878 Mr. J. Cunnack, of Helston, Cornwall, sent me a *Carex* labelled "*Carex arenaria*, slender form. St. Mary's, Scilly Isles, July, 1878, J. Cunnack." Having occasion to carefully examine all my specimens of *C. arenaria*, I felt some doubt about the plant, and wrote to Mr. J. Lloyd, of Nantes, for living specimens of *C. ligerica* and *C. Schreberi*, which he very kindly sent; when these flowered it seemed to me that the Scilly plant was one or the other. I then sent the Scilly specimen to Herr Boeckler, and he returned it named "*C. ligerica* Gay." I wrote to Mr. Cunnack, asking him to gather it this year: he has done so; and Prof. Babington, to whom Mr. Cunnack showed the specimens, agrees with Herr Boeckler's

determination, but considers it only a variety or form of *C. arenaria*. Whether this is so or not, Nyman, in his 'Conspectus,' accepts it as a species, and places twenty-three species between it and *C. arenaria*, but this arrangement is due to its mode of inflorescence. I hope to grow it by the side of *C. arenaria*, and shall watch it under cultivation.—Arthur Bennett.

Polygonum minus Huds. in Cambridgeshire.—This plant, not recorded from the county since the time of Ray, grows in the Washes, along the drift-way at the base of the Barrier Bank, from the toll-house at Welches Dam to the Manea Engine. I have not found it growing in water, but by the sides of ditches and in damp places where the water has stagnated.—Alfred Fryer.

Bupleurum tenuissimum Linn. inland in Cambridgeshire.—In Prof. Babington's 'Flora of Cambs.' this is marked as extinct in the inland localities at Eltisley and Hinton Moor: in October, 1882, I found it growing plentifully at Water-gull Hill, Sutton, in the Isle of Ely. It extended over the bank of the lowered road the whole length of the hill; some plants growing on the highest and dryest part, sixty or seventy feet above the level of the Fens, a considerable elevation in this flat country. The plants were very luxuriant, some being quite eighteen inches high. This station is very like Ray's old Huntingdonshire locality at Great Stukely, where the plant may probably be refound. Like many other annual plants it does not appear every season; this year not one could be found, although it is evidently well established from the great extent and varied nature of the ground it covered.—Alfred Fryer.

Azolla Caroliniana naturalised in Middlesex.—This curious little water plant is just now to be seen in a very strange position on a large pond near Pinner, Middlesex; it is a native of Carolina, U.S., and was brought to this country a few years since to be grown in tanks made in greenhouses. In its present position at Pinner it has succeeded in covering the pond, and the effect is very striking, as it overrides the green chickweed [duckweed.] In places its red tint is very curious, and totally unlike any native pond colouring. I have examined several ponds in the immediate vicinity, and have found a small quantity of it growing on them, so that in course of time it will be, no doubt, as common in this neighbourhood as chickweed [duckweed.] As it is grown in private gardens close by, there is no doubt as to its origin where it is now growing.—T. W. Odell in 'Science Gossip,' Dec., 1883, p. 279.

NOTICES OF BOOKS.

The Shakspere Flora. A Guide to all the principal passages in which mention is made of Trees, Plants, Flowers, and Vegetable Productions; with comments and botanical particulars. By Leo H. Grindon. Manchester: Palmer & Howe. 1883.

It is five years since Mr. Ellacombe published his volume on 'The Plant-lore and Garden-craft of Shakespeare,' of which we

spoke in commendation in this Journal for 1878 (p. 351). It may have been doubted if there was room for another volume on the subject; yet we suspect Mr. Grindon's book will reach many to whom Mr. Ellacombe's is not known, nor can it be said that the two in any way interfere with each other. Those who know Mr. Grindon's style will expect to find in these pages a gracefully written account of trees and flowers, abounding with apt illustration and classical reference, and they will not be disappointed. In some instances new light is thrown upon disputed passages, as where the "cursed hebenon" is identified—we think quite satisfactorily—with the Yew. The identifications mainly coincide with those of Mr. Ellacombe, nor is this to be wondered at, as both writers have evidently taken great pains. But it is to be regretted that Mr. Grindon makes no reference to Mr. Ellacombe's work, of which he is not likely to have been ignorant, and which deserved a word of generous recognition from a fellow-labourer in the same field. We are not quite clear that Mr. Grindon is right in supposing that the word "canker" was transferred to the Dog Rose from the Cynips with which the shrub is so often affected; it is the fruit of the rose which bears the name in several counties, while in others the plant is called Canker-rose, and Heywood, writing in 1636, calls it Canker-flower. The name 'Dian's bud,' overlooked by Mr. Ellacombe, Mr. Grindon includes, but does not identify.

Phytogeogenesis, die vorweltliche Entwickelung der Erdkruste und der Pflanzen in Grundzügen dargestellt, von Dr. Otto Kunze. Leipzic: Paul Frohberg. 1884.

The first portion of this work is occupied with a survey of geological time divided into epochs of temperature. The whole period is separated into two, the inorganic and cryptobiotic period, during which the temperature of the earth ranged between 1000° and 40° C, and, dating from its close to the present time, the phænobiotic period. Both periods are subdivided into epochs of temperature, which Dr. Kunze professes to be able to define either chemically or biologically. The cryptobiotic period thus consists of three epochs, during the last of which lowly organisms made their appearance, but without leaving any trace of their existence. The phænobiotic period is divided into the Azonal-Marine and Zonal-Terrestrial epochs, the first four times and the second thrice subdivided. A discussion of the salting of the primitive fresh-water sea and the relations of life thereto leads up to the author's favourite doctrine of the marine growth of coal-measure vegetation. A sketch illustrative of these views is appended.

We have received a copy of Mr. Tudor's extensive and interesting work entitled 'The Orkneys and Shetland,' which has lately been published by Mr. Edward Stanford, of Charing Cross. The chapters on the Flora, which more especially call for notice here, are by Messrs. W. Irvine Fortescue and Peter White respectively.

From the style of printing—each specific name beginning with a capital letter—we should be inclined to think that the botany had been placed in somewhat unpractised hands, but this may be an editorial blunder. We regret, however, that Mr. Fortescue should not have printed here the list of Orkney plants which he has just completed in the 'Scottish Naturalist,' instead of contenting himself with an enumeration of the rarer species which have been verified by Dr. Boswell. The Shetland list is fuller, but even less satisfactory, and abounds in misspellings. In neither case is there any attempt to give any bibliography of the subject; nor are Prof. Ralph Tate's 'Flora of the Shetland Isles' (Journ. Bot. 1866, pp. 2–15) or Mr. Watson's 'Florula Orcadensis' (Id. 1864, pp. 11–20) so much as referred to. It is only right to add that the other portions of the book seem to have been much more carefully and exhaustively done.

Messrs. Cassell & Co. send us the Third Series of their 'Familiar Garden Flowers' and the Fourth of their 'Familiar Wild Flowers,' which have all the excellencies and all the defects of the preceding volumes. The figures are, with some exceptions, —*e. g.*, the Wood Sorrel,—pretty and accurate, so far as they go; the letterpress is inadequate, and might easily convey much more information without in any way sacrificing the popular style which is essential to works of this kind. In the 'Garden Flowers,' *Centaurea montana* is figured as *C. Cyanus*, to which plant all the descriptive portion refers: the true *C. Cyanus* is given in the 'Wild Flowers.' We doubt if the plant figured as *Potentilla alpestris* is, as Mr. Hibberd implies, the British species known by that name; "Garden Avens" seems an unfortunate "English name" for the plant. *Polemonium cæruleum* is a true British plant, although Mr. Hibberd would persuade us to the contrary. Mr. Hulme's treatment of the wild flowers is less open to criticism than Mr. Hibberd's mode of dealing with the garden ones; but in neither case is the best use made of an excellent opportunity for interesting people in familiar flowers.

We have received from Mr. F. T. Mott, of Leicester, a copy of a pamphlet of twenty-five oblong pages, entitled 'The Fruits of all Countries.' Mr. Mott gives in tabular form a list of 515 "fruits," using the word in its popular, not its botanical sense, showing the native region of each, with the habit of the plant, the appearance and qualities of the fruit, and an indication of what part of the fruit is eaten; the popular name is added where a well-known one exists. A good deal of useful information has thus been brought together.

New Books.—H. R. Goppert, 'Catalog der botanischen Museum der Universität Breslau' (8vo, pp. vii. 54, 1 plate; Gorlitz, Remer).* —E. Burnat & A. Gremli, 'Catalogue raisonné des Hieracium des Alpes Maritimes' (8vo, pp. 84: Geneva, Georg).—J. Duftschmid,

* Contains figure and description of *Agave Goeppertiana* Jacobi, n. sp.

'Die Flora von Oberösterreich' (iii. Band: 8vo, pp. 454: Linz, Korb).—O. Hertwig, 'Die Symbiose oder das Genossenschaftsleben im Thierreich' (8vo, pp. iv. 50: 1 plate: Jena, Fischer).—P. A. Saccardo & G. Bizzozero, 'Flora Briologica della Venezia' (8vo, pp. 111: Venezia, Antonelli).

Articles in Journals.—December.

American Journal of Science. — A. Gray, 'Botanical Nomenclature.'

American Naturalist. — J. M. Coulter, 'Development of a Dandelion Flower.' — J. F. James, 'Position of *Compositæ* and *Orchideæ* in the Natural System.' — C. E. Bessey, 'A new insect-destroying Fungus' (*Entomopthora calopteni*, n. sp.). — J. B. Ellis, 'On *Gymnosporangium* and *Ræstelia*.' — W. Frear, 'Structure of Cell-wall in Cotyledonous Starch-cells of Lima Bean.' — J. B. Ellis & G. Martin, 'New Florida Fungi' (*Aylographum quercinum*, *Peziza gelatinosa*, *Helotium maculosum*, *Meliola manea*, *M. cryptocarpa*, *Asterina delitescens*, *A. carnea*, spp. nn.).

Ann. Mag. Nat. Hist.—M. J. Berkeley & C. E. Broome, 'Notices of British Fungi' (*Laccaria*, gen. nov., to include *Agaricus laccatus*, *A. bellus*, and allies; *Agaricus* (*Crepidotus*) *Ralfsii*, *A.* (*Psathyra*) *glareosa*, *Stereum stratosum*, spp. nn.).

Botanical Gazette (Nov.). — W. G. Farlow, '*Peronosporeæ* of United States' (concl.).

Botanische Zeitung (Nov. 23, 30).—E. Fischer, 'Beitrag zur Kenntniss der Gattung *Graphiola*.'—(Dec. 7). A. F. W. Schimper, 'Erwiderung.'—H. Wydler, 'Einige Berichtigungen zu Delpino's Teoria Generale della Fillotassi.'—(Dec. 14). J. Goroschankin, 'Zur Kenntniss der Corpuscula bei den Gymnospermen.' — A. Hansgirg, 'Ueber die Bewegungen der Oscillarien.'

Botanisches Centralblatt (nos. 48–51).—H. Pick, 'Bedeutung des rothen Farbstoffes bei den Phanerogamen und die Beziehungen desselben zur Stärkewanderung' (1 plate).

Botaniska Notiser.—C. Melander, 'Bidrag till Vesterbottens och Lapplands flora.'—A. L. Grönvall, 'Bryologiska notiser.'—E. Ljungström, '*Carduus acanthoides* L. × *crispus*.'—J. O. B. N. Krok, 'Svensk botanisk literatur 1882.'

Flora (Nov. 11 & 21).—P. Krüger, 'Die oberirdischen Vegetationsorgane der Orchideen in ihren Beziehungen zu Clima und Standort' (cont.).—P. G. Strobl, 'Flora der Nebroden' (cont.).—(Dec. 1). W. Nylander, 'Addenda nova ad Lichenographiam europæam' (several new species, including *Lecidea contenebricans* Nyl., from Red Screes, Westmoreland. and *Verrucaria globosa* Tayl. mss. from 'Blackwater in Hibernia.')

Garden (Dec. 1). — *Oncidium macranthum* (ic. pict.).—(Dec. 8). G. Nicholson, 'The Magnolias' (*M. parviflora*, ic. pict.)—Dec. (15). Fruit of *Physianthus albens* (fig.). — 'British Orchids in Somersetshire.' — *Crossandra undulæfolia* (ic. pict.). — (Dec. 22). *Mutisia decurrens* (ic. pict.).

Gardeners' Chronicle (Dec. 1).—*Zygopetalum Burkei* Rchb. f., *Cypripedium Robbelenii* Rchb. f., spp. nn. — W. B. Hemsley, 'Australian seed-vessels.'—G. Murray, 'The Potato Disease.'—(Dec. 8). *Galeandra Harveyana* Rchb. f., sp. n.—*Caraguata sanguinea* (fig. 127). — W. G. Smith & C. B. Plowright, The Potato Disease.—(Dec. 15). *Adiantum Wiegandii* Moore, sp. n.—*Desmodium paniculiflorum* (fig. 133). — C. B. Plowright and G. Murray, The Potato Disease.—*Cestrum nocturnum* (fig. 138). —(Dec. 22). G. Pim, 'A mould on Ensilage.' — *Oncidium Jonesianum* Rchb. f., n. sp. — C. T. Druery, 'Proliferous *Athyria*.' —J. L. Jensen & W. G. Smith, The Potato Disease.—(Dec. 29). *Oncidium eurycline* Rchb. f., n. sp.—A. Dickson, 'Nepenthes pitchers.'—*Ipomæa Thomsoniana* Mast., sp. n. (fig. 147).

Magyar Nov. Lapok.—A. Kanitz, '*Anemone angulosa*.'

Midland Naturalist. — W. B. Grove, 'Fungi of Birmingham' (second list).

Naturalist. — W. B. Turner, 'Algæ of Strensall Common' (1 plate).

Nature (Nov. 22).—W. J. L. Wharton, 'Mangrove as a destructive Agent.'

Œsterr. Bot. Zeitschrift,—J. Velenovský, 'Böhmische Pflanzenarten' (*Hieracium Freynianum*, *H. polycephalum*, spp. nn.).—J. B. Wiesbaur, 'Bosnische Rosen.'—V. v. Borbás, '*Stipa eriocaulis*.'—M. Krönfeld, 'Zur Flora von Niederösterreich.'—P. G. Strobl, 'Flora des Etna' (cont.).

Pharmaceutical Journal (Nov. 24 & Dec. 22). — E. M. Holmes, 'Vegetable Tallow from Singapore.' — (Dec. 1). Obituary of J. E. Howard.—(Dec. 15). W. T. T. Dyer, 'Vegetable Tallow.'

Science-Gossip.—E. D. Marquand, 'Moss-hunting at the Land's End.'

BOTANICAL NEWS.

A BRASS memorial tablet has been placed in a little cenotaph erected many years ago in the Royal Botanic Gardens, Peradeniya, Ceylon, to the memory of Mr. G. Gardner, the Brazilian traveller. The inscription is as follows: —

"GEORGIUS GARDNER, Soc. Linn. Soc., horum hortorum ab anno 1843 ad 1849 Custos, rei herbariæ peritus, viarum strenuus, flores, herbas, arbores utriusque orbis diligentissime scrutatus est. Qui ut in memoriam habeatur hoc cenotaphium posuerunt amici Taprobanenses a. d. 1855. Obiit in urbe Nuwara Eliya a. d. vi. Id. Mart. anno 1849, ætat. 37."

We regret that the demands on our space cause the postponement of the Linnean Society's proceedings, obituary notices, and other matter, until our next issue.

ON PROTOPLASMIC CONTINUITY IN THE *FLORIDEÆ*.

By Thomas Hick, B.A., B.Sc.

(Plates 243 & 244.)

The observations on which this paper is based were commenced some years ago, but owing to the pressure of other work were interrupted before any decisive results suitable for publication had been obtained, and were subsequently almost entirely forgotten. They were called to mind by a perusal of Strasburger's* suggestive paragraphs on protoplasmic continuity, and the papers lately published in the 'Quarterly Journal of Microscopical Science'† on the same subject, and were resumed in the hope of adding something material to the discussion of so important a question.

The specimens employed in the investigation were partly sun-dried and partly fresh, the former having been found in the majority of instances quite as demonstrative as the latter. Indeed most of the histological details described, even some of the more refined ones, were made out in a satisfactory and convincing manner in specimens which had been kept for one, two, or more years in a dry state. In dealing with such specimens it was only necessary to immerse them in water for a short time, after which they could be examined with the same facility as freshly-gathered material.

No special methods of preparation have been resorted to, though recourse has been had to sections made in various directions, and to some of the more important micro-chemical reagents. In fresh specimens it was often necessary to contract the protoplasmic contents of the cells a little, in order to bring out the details described. This was generally done by a mixture of chlorate of potash solution and dilute nitric acid. When it was desirable to stain as well as contract the cellular contents, the specimens were placed for some time in a solution of picric acid, then thoroughly washed, and afterwards stained with aniline blue, magenta, &c.

The object of the following paragraphs being to show the existence of protoplasmic continuity in several of the more important genera, and a large number of species of *Florideæ*, the *organisation* of the protoplasmic contents and the cell-walls are matters altogether beyond their scope. Many notes have been made on these points during the course of the investigations here summarised, but on the present occasion they will not be considered.

1. Callithamnion.

The genus *Callithamnion* includes a number of small but pretty Rhodosperms, whose general appearance and organisation are well known to the marine algologist. Fundamentally they consist of

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* "Ueber den Bau und das Wachsthum der Zellhäute," p. 246.

† "Plant Cells and Living Matter," by Louis Elsberg, M.D., *loc. cit.*, January, 1883; "On Plasmolysis," by F. O. Bower, M.A., *loc. cit.*, Jan., 1883; "Some Recent Researches on the Continuity of Protoplasm through the Walls of Vegetable Cells," by Walter Gardiner, B.A., *loc. cit.*, April, 1883.

repeatedly branched filaments, composed of a single row of cells, joined end to end, the whole often forming a delicate feathery frond, in which one may distinguish the central axis from the primary, secondary, and other branches. Some of the species, e. g., *C. Rothii*, retain this comparatively simple structure throughout the whole frond; but in others some degree of complexity is introduced into the older parts by the development of a cortex composed of descending filaments, which become adherent to the main axis. In *C. roseum* these filaments arise from the bases of the lateral branches, are few in number, and are confined to the stouter portions of the stipes and its primary branches. They do not become interwoven so as to form a complete investment, but remain isolated, and run for the most part parallel to the stronger filament to which they are attached. In *C. arbuscula* and *C. tetragonum*, which are among the most robust forms, they are much more numerous, and become so closely felted together as to form a cortex of considerable thickness compared with the central filament which it envelopes.

Very little examination of the Callithamnions is needed in order to demonstrate the existence of protoplasmic continuity in every part of the frond.

In *Callithamnion Rothii* the contents of each cell are connected longitudinally with those of the next by a single fine protoplasmic thread.

Similarly, in the main filaments of *C. roseum*, it is possible to trace continuity from cell to cell for considerable distances, colourless threads of protoplasm running through the thickened transverse partitions in a most distinct manner. The matured cells are several times as long as they are broad, and the protoplasmic contents are often contracted at the middle of the cell, while at the ends they swell out considerably, or rather remain uncontracted. A single connecting thread of protoplasm proceeds from the centre of the uncontracted mass, and runs in a straight line from one cell to the other right through the end walls of the contiguous cells. Continuity is brought about therefore by means of single threads, and not by several such, as occurs in the sieve tubes of Dicotyledons.

In the lateral branches continuity of a similar character is equally evident, and it is frequently possible to trace it from cell to cell along the whole length of a branch. Moreover, the protoplasm of the basal cell of a branch is in the same manner connected with that of the axial cell from which it arises. So also the cells of the cortical filaments have their protoplasmic bodies united, not only one with another, but also with that of the basal cell of the branch from which they take origin. The connecting threads grow with age, but, as they do not attain any great degree of thickness, it will be readily understood that here and there they may occasionally be ruptured. But the absence of continuity is so exceptional that no observer who carefully goes over one or two specimens will have any difficulty in convincing himself that the normal condition is one of uninterrupted continuity throughout the whole frond.

Several observers have described a small protoplasmic pedicel,

connecting the mass which is subsequently converted into tetraspores, with that of the cell, of which it forms a lateral appendage. It will be obvious that this is a case of protoplasmic continuity of a like nature to that which obtains in the vegetable cells. It may be added that the tetraspores themselves are for a time connected together in a similar manner.

In illustration of these details Plate 243, figs. 1, 2 may be consulted. From this it will be seen that at the point where the connecting thread passes through the transverse partition there is a small lenticular body, whose optical appearances differ from those of the protoplasm. It is so small in the Callithamnions that it is not easy to determine its true natnre, but from what occurs in other Rhodosperms, where the connections are on a much larger scale, there is reason to believe that it is a collar-like thickening of the cellulose wall through which the thread passes.

A still more remarkable exhibition of protoplasmic continuity than the preceding is that presented by *Callithamnion arbuscula*. Here, as previously mentioned, the stipes is densely corticated, and the whole plant attains larger dimensions. The organisation of the stipes can only be studied by making transverse and longitudinal sections. If this be done a structure will be met with, which is represented on Plate 243, fig. 3. This shows that the cells of the central portion of the stipes are of considerable size, and are clothed with a dense felted mass of cortical filaments, which for the most part run longitudinally, but in a somewhat oblique direction. The protoplasm of each axial cell is unmistakably connected with that of the cells above and below it. The nature of that connection is at times peculiar. The protoplasm of caeh cell is contracted more or less about the middle of the cell, and is dilated at the ends, as described in *Callithamnion roseum*. The dilated ends occasionally appear to be hollowed out, like the bell-end of a trumpet, and from the centre of the hollow the connecting cord of protoplasm passes onwards to the transverse wall. At the point where the cord passes through the partition it is enclosed in a sort of thickened ring or collar, and in some instances the cord presents a striated appearance.

The very thick cortex is as remarkable from the point of view of this paper as is the central siphon. The filaments of which it is composed exhibit continuity throughout, and present a most characteristic appearance. Some idea of this may be gathered from fig. 3, but it is hardly possible to do justice to it in a drawing. With scarcely an exception the fine connecting threads are provided with a small collar, and this usually remains when the thread is ruptured.

A further point to be noticed is that similar connections exist between the central cells of the stipes and those of the primary branches, and between the cells of the primary branches and those of the secondary branches, so that from the base or point of attachment of the frond to the freely growing tips of the ultimate branches the extremity of the protoplasm is in the normal condition, unbroken.

The only other species in my possession are *C. byssoides* and *C. polyspermum*, in both of which similar phenomena are to be met with.

2. Polysiphonia.

Passing from *Callithamnion* we may next consider, in reference to our subject, two or three species of *Polysiphonia*.

*Polysiphonia urceolata** is a species whose vegetative structure is of a very simple character, both in its morphological and histological aspects. The thallus consists of long delicate filaments of a deep red colour, from which lateral branches, having similar characters, arise sympodially. Examined microscopically, every filament and every branch is found to be organised as follows:—In the centre of the filament is an axial row of cylindrical cells, placed end to end, which constitutes the "central siphon" of marine algologists. Completely enveloping this are four so-called "cortical siphons" running parallel with it, and composed of similar cells, arranged in a similar manner. The cells of the "cortical siphons" have a somewhat greater diameter than those of the centre, but they are equal to them in length, and are so placed that their transverse partitions coincide with those of the axis. The filament may be said therefore to be articulated, each section being composed of a central cell enclosed by four cortical cells.

As in the species of *Callithamnion* referred to above, so here, there is an unbroken continuity of the protoplasmic structures throughout the entire thallus. How this is effected is shown in plate 243, fig. 4, which represents a portion of the plant as seen in optical longitudinal section. At (*a*) is a cell of the central siphon, and at (*b*) two cells of two cortical siphons.

The first point to be noticed is the fact that at the upper and lower ends of the cells, whether central or cortical, the protoplasm of contiguous cells is united by a connecting thread. At the point where the thread passes through the transverse partition a small lenticular body is usually to be seen, which obviously corresponds with the collar noticed in *Callithamnion*. Though the connecting thread is evidently protoplasmic in its composition, it ought to be noted that it is often destitute of granules, and seldom stains with iodine as deeply as the rest of the protoplasm. Moreover, it is often wanting in the colouring-matter which permeates the contents of the cells, a character which appears to be very common in such threads, especially when young.

The next point to be noticed is that the protoplasm of the central cell is connected by short lateral processes with the protoplasm of the cortical cells. This is shown at (*c*). These processes are similar to those already described, and are generally situated

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* It is due to Professor E. P. Wright, of Dublin, to state that, so long ago as 1878, he described protoplasmic continuity in this and two or three other species of *Polysiphonia* in a paper on "The Formation of the so-called 'Siphons,' and the Development of the Tetraspores in *Polysiphonia*," published in the 'Transactions of the Royal Irish Academy' for 1879. I was quite unaware of this when the above description was drawn up.

near the middle of the cell, but not always at exactly the same level.

Polysiphonia fastigiata is constructed on a plan which is fundamentally the same as that of *P. urceolata*. The thallus consists of a repeatedly branched filament composed throughout of a "central siphon," surrounded by a number of "cortical siphons." Moreover, the ends of the central cells coincide with those of the cortical ones. The mode of branching is, however, dichotomous, and the number of cortical siphons much larger, usually averaging abont twenty. The modifications met with in the different siphon cells are also much more considerable than any that occur in the species just described.

As regards protoplasmic continuity, there is the same primary agreement accompanied by secondary differences. The protoplasmic bodies of the siphon cells are connected longitudinally by single cords of the same material, which pass through the end walls of contiguous cells. In the case of the central cells these are not fine hyaline filaments, but comparatively stout cords, which present the appearances of ordinary protoplasm. At the middle point or thereabouts of the connecting cord there is a well-marked collar, as in the cases previously described. The longitudinal connecting threads of the cortical siphons are much finer than those of the central one, and are less granular in appearance. There is, however, on each of them a collar at about the middle point. These details are represented in Plate 243, fig. 5.

Here again, then, we have a protoplasmic continuity in the longitudinal direction quite as striking as that of *Callithamnion*. But this is not the only direction in which such a continuity exists, for, as in *Polysiphonia urceolata*, there is a lateral continuity also. The peculiar features of this lateral continuity give quite a character to the central siphon cells of *P. fastigiata*, which has not been noticed in other species.

When in a young condition these cells would seem to be more or less rounded in shape, and the protoplasm fills up the whole of the lumen of the cell. As the cell grows older the wall becomes thickened. The thickening, however, is not uniform, but varies in different parts in such a manner that the protoplasm ultimately assumes the shape of a teetotum, whose body is sometimes flattened on the upper and lower surfaces (Plate 243, fig. 5). But in assuming this shape the protoplasm of each cell does not become altogether isolated. On the contrary, a number of lateral processes—one for each cortical cell — radiate away through the thickening layers until they reach the original boundary of the cell. Even here they do not terminate, but, passing through a number of minute apertures, they enter the cortical cells, with whose protoplasm they finally unite. In this way the protoplasm of the central cell is brought into direct communication with the protoplasm of each of the cortical cells which surround it, the whole forming an interconnected system, whose protoplasmic continuity is unbroken. Plate 243, fig. 5, will afford an idea of the arrangement described, as seen in optical longitudinal section.

From the appearances it presents in this species the collar, which is a conspicuous feature on the connecting threads, would seem to be a sort of lip-like thickening round the margin of the aperture through which the thread passes. Within the collar a delicate diaphragm make sits appearance in the older parts, and both collar and diaphragm grow in diameter as the protoplasmic thread increases in thickness. When the cells are ruptured by mechanical or other means, and the protoplasm exudes, it usually carries with it both collar and diaphragm, though not always. In the latter cases the diaphragm presents itself as a very delicate oval membrane, with a thickened margin.

(To be continued.)

WORCESTERSHIRE PLANTS AND "TOPOGRAPHICAL BOTANY."

By William Mathews, M.A.

Every student of the distribution of the plants of the British Isles must have examined the pages of the 2nd edition of 'Topographical Botany,' to ascertain how far they exhibit an adequate picture of the flora of the district with which he is most familiar. I have performed the task for the county of Worcester, and submit to the readers of the 'Journal of Botany' the results of the comparison.

The materials for the flora of the county are contained in 'The Botany of Worcestershire,' by my friend Mr. Edwin Lees (Worcester, 1867); 'The Botany of the Malvern Hills,' by the same author (London and Malvern, 1868); and the 'Flora of the Clent and Lickey Hills,' by the present writer (2nd edition, London and Stourbridge, 1881). Some uncertainty attaches to the census in Mr. Lees' volumes, from the fact that plants from the adjoining counties of Gloucester, Hereford, Salop, Stafford, and probably Warwick, have been included in his lists where the plants were found growing near to the boundary of the county of Worcester.

The following notes are mainly derived from a recent examination of my own herbarium; Mr. J. E. Bagnall, of this town, having been so obliging as to assist me by checking the Rubi. I have had the further advantage of consulting an excellent collection of Malvern plants made by Mr. R. F. Towndrow, of Malvern Link, who has kindly furnished me with duplicate specimens of the critical species. I have scheduled all the Worcestershire plants omitted or queried in 'Topographical Botany' of which I have actual specimens in my possession, or record of having myself collected, and have added such information on the plants of adjoining counties as is of interest in relation to those of the county of Worcester. The plants to which a ? is prefixed are queried for the county in 'Topographical Botany'; the remainder are additions to the list.

Ranunculus heterophyllus Fries. (Floating leaves with wedged-shaped segments.) Uffmoor, Halesowen, 1863! Bittel Reservoir, Alvechurch, 1876!—*R. trichophyllus* Chaix. The Wildmoors, Feckenham, 1871!—*R. penicillatus* Dumort. Form *pseudo-fluitans* Newbould. Omitted from Worcester and Stafford. Almost certainly in Worcester, certainly in Stafford. I have specimens from Stafford, gathered within a few yards of the boundary of the county of Worcester, in a stream at Harborne Reservoir, near Birmingham, 1868!—*R. Lenormandi* Schultz. Pedmore Common, Stourbridge, 1871! The Birches, Hagley, 1871!

? Corydalis claviculata DC. Hurcott Wood, Kidderminster, 1846; Bromsgrove Lickey, 1850! North Hill, Malvern, Mr. R. F. Towndrow, 1872! One of the characteristic plants of the Malvern Hills.

Fumaria confusa Jord. Allotment Gardens, Malvern Link, R. F. T., 1883!

? Lepidium latifolium L. Queried for Worcester. Discovered in 1852, by the Rev. J. H. Thompson, on the banks of the River Salwarp, at Droitwich (see Bot. of Worc., p. 37). Same loc. 1877, Rev. J. H. T.!

Barbarea stricta Fr. Bromwich, Worcester, 1883. R. F. T.! (see Journ. Bot., 1880, p. 374); Manor Farm, Halesowen, 1833!

Sinapis Cheiranthus M. & K. "Casual or doubtful." Sutton Common, Kidderminster, 1874! 1876!

Polygala vulgaris L. Malvern, in many places, R. F. T.! Bewdley, 1846! Ridge Hill, Martley, 1853!—*P. depressa* Wend. Numerous localities in north of county, 1846 to 1882!

Sagina ciliata Fr. Blakedown, Kidderminster, 1848; Hagley Brake, 1883, F. Arnold Lees! Also in Stafford, Kinver Edge, 1877!

Melilotus arvensis Willd. Wolverley, 1853! Frankley, 1871! Goods sidings at Stourbridge Junction Railway Station, 1875–6–7!

Potentilla verna L. Malvern, 1883, R. F. T.!

Geum intermedium Ehrh. Lower Sapey, 1848! Illey, Halesowen, 1850! Harris's Wood, Frankley, 1850!

Rubus saxatilis L. Queried for Salop; Wyre Forest, 1846! Wyre Forest is in the three counties of Worcester, Salop, and Stafford. Certainly growing in 1846 in the Shropshire part of the Forest; not certainly known in the Worcester part.—*R. Salteri* Bab., *β. calvatus* Blox. Wyre Forest, Worcester, 1854! *R. macrophyllus* W. & N. Form *β.* Bab. Man., 8th edit. Wyre Forest, 1851! 1854! Twiland Wood, Frankley, 1871; Little Farley Wood, Halesowen, 1871!—*R. Sprengelii* Weihe, *α. Borreri.* Warley, Halesowen, 1873!—*R. Bloxamii* Lees. Shrawley Wood, 1849!—*R. Hystrix* Weihe. Shrawley Wood, 1849! Uffmoor Wood, Halesowen, 1850! Wyre Forest, Worcester, 1853!—*R. Radula* Weihe. Uffmoor Wood, Halesowen, 1871!—*R. diversifolius* Lindl. Wannerton Downs, Kidderminster, 1849!

Agrimonia odorata Mill. Tidsley Wood, Pershore, 1855! Hunnington, Halesowen, 1856! Westwood Park, Droitwich, 1859! Shrawley Wood, Miss Moore, in Herb. Towndrow, 1883!

Epilobium tetragonum L. (true). Witley Court Plantations,

1846! Newland, Malvern, R. F. T., 1883!—*E. obscurum* Schreb. Common in the north-east of the county. Many localities!

Myriophyllum spicatum L. Pools near Kidderminster, 1882!

Callitriche stagnalis Scop. Queried as *C. platycarpa*. Common.

Apium graveolens L. "Worcester, perhaps wild." Droitwich Canal, 1859! Locally abundant in south of county. (See Bot. of Worc.).

Galium erectum Huds. Banks of Bewdley and Kidderminster Railway, 1883, F. A. Lees.

Valerianella carinata Loisel. Omitted from Worcester and Salop. "Wall at Spring Grove, between Kidderminster and Bewdley, 22nd June, 1850," as per note in my Journal, but the specimen has been lost. The omission of this plant from Salop is remarkable, as the plant is recorded in Leighton's 'Flora of Shropshire,' 1841, and the original specimens are in the Cambridge Herbarium.

Hieracium murorum L. (true). North Wood, Bewdley, 1850! Wyre Forest, Worc., 1853! Fenny Rough, Stone, 1883!—*H. vulgatum* Fr. Common in the north of the county. Many localities!

Barkhausia taraxacifolia Mœnch. Malvern Link, 1883, R.F.T.! Railway bank, Kidderminster. Dr. Fraser, 1883!

Scrophularia Ehrharti C. A. Stev. Severn Side, Shrawley, R. F. T., 1883!

Linaria repens Ait. Clent Hill, 1883! Recently discovered by Mr. J. W. Oliver.—*L. minor* Desf. Field near Trench Wood, 1853!

Orobanche minor Sutt. (true). Wick, near Pershore, 1857! Malvern, 1878, R. F. T.!

Myosotis sylvatica Ehrh. Droitwich, 1856! Manor Farm, Halesowen, 1858! 1883! Twiland Wood, Frankley, 1858! Alvechurch, 1858! Wolverley, 1863!

Glaux maritima L. One of the characteristic plants of the saline waters of Droitwich (see Bot. of Worc., p. 36). Porter's Mill, near Worcester, 1878, Rev. J. H. Thompson!

Rumex pratensis M. & K. Wannerton Downs, Kidderminster, 1849! By the Teme, at Ham Bridge, 1853!

Orchis ustulata L. Near West Malvern, 1883, R. F. T.! — *O. latifolia* L. (*O. maialis* Reich.). Leigh, Malvern, 1883, R. F. T.! Queried for Worcester.

Polygonatum multiflorum All. Fenny Rough, Stone, 1883! Recently discovered by Mr. F. Arnold Lees.

Potamogeton flabellatus Bab. In the Stour below Kidderminster, near the Bewdley Railway Viaduct, 1875! *fide* C. C. B.—*P. obtusifolius* Koch. Malvern Link, R. F. T., 1881! Pond at Trimpley, Rev. J. H. T., 1883! — *P. natans* L. (true). Very common.

Juncus Gerardi Lois. (true). Saldings, near Droitwich, 1856! Canal side, Droitwich, 1856!

Scirpus Tabernæmontani Gmel. Westwood Park, Droitwich, 1859!

Eriophorum latifolium Hoppe. Wyre Forest, Worc., 1847!

? Carex axillaris Good. Queried for Worcester, Barnard's and Sherrard's Green, Malvern, 1883, R. F. T.! — *C. binervis* Sm.

No authority for Worcester. Craycombe Hill, 1859! Bromsgrove Lickey; Winwood Heath.

Of the 51 plants enumerated in the above list 49 have certainly been found in the county of Worcester. Of these, 48 are wholly omitted, either as species or subspecies, from the comital census in the 2nd edition of 'Topographical Botany.' The remaining seven are branded with queries, or other expressions of uncertainty. Among the omissions are some well-defined species which have been known in the county as familiar inhabitants for upwards of thirty years.

It would be interesting to learn whether the records for other counties are equally defective. If such be the case, I venture to suggest to the able editors of the volume the advisability of preparing for a third edition, by printing lists of the desiderata for each county, and circulating the lists among local botanists likely to supply them. The expense would not be great, as it would be sufficient to print the specific numbers only.

If I had included in the list of omissions all the omitted plants recorded elsewhere as occurring in Worcestershire, the number would at least have been doubled. I have refrained from noting many such species, as they are not vouched by authentic specimens in my own possession. Some species, on the other hand, admitted as inhabitants of the county, have scarcely established a permanent claim to that distinction. I will mention two, in the hope of stimulating further search for them. In the year 1857, the late Mr. Alexander Irvine, author of the 'Illustrated Handbook of British Plants,' and then editor of the 'Phytologist,' announced the discovery, in a mill-pond near Churchill railway-station, of both British species of *Elatine* (see 'Phytologist' for April, 1858, vol. ii., p. 401). In 'Topographical Botany,' under the head of Worcester, they appear as follows:—

"*Elatine hexandra*. (E. Lees). One locality.
Elatine Hydropiper. Irvine, sp."

It might be inferred that Mr. Lees had himself noted *Elatine hexandra*. He assures me, however, that such is not the case, and that he sent the record on Irvine's authority. Since the year 1858 every mill-pond in the locality, and there are many of them, has been repeatedly examined by competent botanists, without yielding the slightest trace of either species.

GENERIS *RUBORUM* SPECIEM NOVAM.

PROPONIT H. F. HANCE, Ph.D.

1819

Rubus (IDÆOBATUS, ELLIPTICI?) **aralioides**, sp. nov.—Ramulis teretibus flexuosis tomento brevi intermixtis glandulis stipitatis vestitis aculeis brevibus e basi lata recurvis v. rectiusculis armatis, stipulis petiolaribus setaceis integerrimis hirsutis, foliis pinnatim trifoliolatis petiolo communi 2–3 pollicari parce aculeato tomentoso et capitato-glanduloso foliolis mollibus ovatis acuminatis crebre

cuspidato-serratis supra pilosulis subtus pallidioribus breviter tomentosis et glandulosis tenuiter penninerviis costa subtus aculeolata lateralibus basi rotundatis vel truncatis brevissime petiolulatis 2–3 poll. longis terminali basi cordato $2\frac{1}{2}$–4 pollicari petiolulo $1\frac{1}{2}$ pollicari, floribus in racemos axillares folia circ. æquantes necnon in paniculas angustas virgatas densifloras efoliatas dispositis rachi glandulis stipitatis dense vestita, bracteis bracteolisque lineari-setaceis integris v. pauci-laciniatis glandulosis, calycis pedicello æquilongi extus densissime stipitato-glandulosi intus cinereo-tomentosi ad medium divisi lobis ovatis setaceo-acuminatis 2 lin. longis, petalis læte roseis unguiculatis obovatis apice denticulatis 2 lin. longis, staminibus calyci fere æquilongis, receptaculo piloso, ovariis numerosissimis oblongis compressis glaberrimis stylo 4–5 plo brevioribus.

Ad rivulos, infra torrentem Sui-tin-mun, jugi Lo-fau-shan, prov. Cantonensis, alt. 1000 ped., Maio 1883, leg. rev. B. C. Henry (Herb. propr. n. 22211).

Deficiente adhuc fructu, pulcherrimæ hujus stirpis locum systematicum non absque dubio statui. Inter omnes tamen mihi notas species *R. elliptico* Sm. proxima videtur, etsi sane distinctissima.

Sequentes ex imperio sinensi *Rubos* in proprio herbario adservo.

1. *Rubus* (*Malachobatus*, *moluccani*) *reflexus* Ker. Kwang-tung.
2. *R.* (*Malachobatus*, *moluccani*) *rugosus* Sm. Kwang-tung.
3. *R.* (*Malachobatus*, *moluccani*) *pacificus* Hance. Kiang-si. *R. Bürgeri*, Miq. ! appropinquandus.
4. *R.* (*Malachobatus*, *elongati*) *ochlanthus* Hance. Kwang-tung.
5. *R.* (*Malachobatus*, *elongati*) *tephrodes* Hance. Kiang-si.
6. *R.* (*Malachobatus elongati*) sp. Kwang-si. Præcedenti affinis.
7. *R.* (*Malachobatus*, *elongati*) *Fordii* Hance. Kwang-tung.
8. *R.* (*Malachobatus*, *elongati*) *Parkeri* Hance. Sz-ch'uan.
9. *R.* (*Malachobatus*, *hexagyni*) *Swinhoii* Hance. Formosa.
10. *R.* (*Malachobatus*, *hexagyni ?*) *jambosoides* Hance. Fo-kien.
11. *R.* (*Batothamnus*, *corchorifolii*) *corchorifolius* Linn. f. Kwang-tung, Che-kiang, Kiang-su.
12. *R.* (*Batothamnus corchorifolii*) *althæoides* Hance. Fo-kien.
13. *R.* (*cratægifolii*) *cratægifolius* Bge. Chih-li.
14. *R.* (*Idæobatus*, *rosifolii*) *rosifolius* Sm. Variæ provinciæ.
15. *R.* (*Idæobatus*, *rosifolii*) *Thunbergii* S. & Z. Kiang-su.
16. *R.* (*? Idæobatus*, *idæi*) *leucanthus* Hance. Kwang-tung.

A cl. Dre. Focke * inter Eubatos, oligogynos, locatus.

17. *R.*(*Idæobatus hypargyri*) *triphyllus* Thunb. Variæ provinciæ.
18. *R.* (*Idæobatus hypargyri*) *triphyllus* Thunb., β. *intermuntius*, Hance. Kiang-su.
19. *R.* (*Idæobatus*, *elliptici*) *aralioides* Hance. Kwang-tung.

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* Abhandl. naturwiss. Ver. zu Bremen, 4 Bd. 2 Heft, 193.

PLANTS GATHERED IN THE COUNTIES OF PEMBROKE AND GLAMORGAN.

By A. G. More, F.L.S.

During last August I made, with my sister, a short tour in South Wales, and I think that a few of the plants which we observed may be worth notice in the 'Journal of Botany.'

At and about St. David's Town.

Leonurus Cardiaca.
Teucrium Chamædrys.
Antirrhinum majus.
Centranthus ruber.
Petroselinum sativum.
Teucrium Chamædrys.
Dianthus Armeria.
Borago officinalis.
Verbena officinalis.
Mentha rotundifolia.
Rumex pulcher.
Marrubium vulgare.
Erodium moschatum.
Parietaria officinalis.

All in and about the ruins of the Cathedral buildings. These afford a rich sample of a ruin or mural flora, yet, as will be seen, quite different from that of some other castle ruins in South Wales. *Leonurus* is well established on a stone wall in the yard of a cottage near Whitesand Bay.

At and near to Whitesand Bay.

Erodium maritimum.
Festuca arundinacea.
Viola Curtisii.
Cotyledon Umbilicus.
Convolvulus Soldanella.
Geranium columbinum.
Carex muricata.
Erodium moschatum.

This is a very poor locality for maritime plants.

Colonists in Sandy Fields near Whitesand Bay.

Silene anglica.
Papaver hybridum.
Antirrhinum Orontium.
Lycopsis arvensis.
Echium vulgare.
Fumaria confusa.
Papaver Rhœas.
Centaurea Scabiosa.
Scleranthus annuus.
Lamium amplexicaule.
Stachys annua.
Raphanus Raphanistrum.
Spergula arvensis.
Valerianella dentata.
VeronicaBuxbaumii.
Linaria Elatine.

At Whitesand Bay we sought long and repeatedly for *Cyperus longus* without finding it, though furnished, through the kindness of Mr. Britten, with what seemed most exact directions to the locality where this very rare species had been gathered just one hundred and ten years ago; and, as an undoubted specimen is preserved in the Banksian Herbarium at the British Museum, I can only conjecture that modern alterations, however slight, have led to the extirpation of the plant.

The British Museum label reads:—"July 23. 1773 Pembrokeshire, two miles from St. Davids by the side of a small rivulet in a place calld White sand Bay ½ a mile South of St. Davids Head between that and a farm house calld Trelethen and not above ¼ of a mile up the rivulet from the sea: it grew in one place only in a clump."

The stream is small and easily found, and the distance from the sea so short that I expected to find the *Cyperus* without any difficulty, especially as we were quite familiar with its appearance in the Isle of Wight localities. There is a road crossing the little rivulet at about the right distance from the sea, and along the stream below this point a bank has been thrown up, dividing a pasture on the east from the field on the western side of the rivulet, which is now under tillage. Still, there are marshy corners which look likely ground, and wet slopes on which some barren stems of the *Cyperus* might still linger; but above and below this little bridge and all along the stream we sought most carefully, without finding a trace of the *Cyperus*, and I fear the one patch observed in 1773 has ceased to exist.

At St. David's Head.

Statice occidentalis.
Sedum Telephium.
Genista pilosa.
Sagina subulata.
Allium Scorodoprasum, var. Sibiricum.

In the case of *Genista pilosa* we were more fortunate, though at first this plant quite eluded us, through the incorrect description of its locality given in the 'Botanist's Guide.' It does not grow "on the very western extremity of St. Davids Head"; and with this misleading direction we spent the best part of two days in searching the extreme headland itself; that is the most westerly portion, which is cut off, as a fort, by an ancient wall and trench. Here was no trace of *Genista pilosa*, and it was only on the last day of our visit, when walking along the southern slope of the promontory, a good half-mile from the headland, that we succeeded in finding one of the best plants of St. David's. The *Genista* is quite local, and not very abundant, but we found it scattered for a hundred yards or two among the heather, close to where the Brake (*Pteris aquilina*) begins to vary the smoothness of the grassy hill. Only a very few blossoms were in flower.

A still more remarkable plant, and in Cornwall also a close neighbour of the *Genista*, we gathered in, I believe, its second British locality: *Allium sibiricum* grows on the broken rocky slopes on the north side of the ancient fort, within and to the westward of the wall. It is quite restricted to a space of less than a hundred yards; and I must confess that, however pleased in finding such a rarity, I could not help remembering how many others of the genus *Allium* are liable to suspicion as natives, and it did occur to me that possibly here was the true old Leek of Wales, in former times probably employed as a pottage herb by the occupiers of that fortified headland. In Ireland I have seen *Allium Babingtonii* only

where associated with, or in the vicinity of, ruins or cultivation. Similarly, at Killarney, *Allium Scorodoprasum* is too closely connected with the rides known as the "Monks' Walks," and in Ireland has only one other very restricted station, near Cork. So that, in all three cases, we are probably dealing with relics of very ancient cultivation, dating from the time of the early Celts or Britons, to which it is scarcely an objection that the native or original habitat of *Allium Babingtonii* has not yet been ascertained.

At and near to Dowrog Pool.

Aira uliginosa.
Cicendia filiformis.
Radiola Millegrana.
Scirpus Savii.
Hypericum Elodes.
Eleocharis multicaulis.
Pilularia globulifera.
Alisma ranunculoides, var. repens.
Littorella lacustris.
Heliosciadium inundatum.
Scirpus fluitans.
Drosera rotundifolia.
Sparganium simplex.
Mentha Pulegium.
Malva rotundifolia.

Of these *Cicendia*, frequent also on moist heathy ground to the west of St. David's, finds here its northern limit in Wales. *Aira uliginosa*, plentiful in many places round Dowrog Pool, is new to West Britain. *Alisma repens*, with its large flowers and often growing in the water, might easily be mistaken for *A. natans*. *Littorella* new to Pembrokeshire.

Agrimonia odorata occurs in one place by the roadside towards St. Justinian's Chapel. *Erodium moschatum* is frequent, and so are *Mentha rotundifolia* and *Calamintha officinalis* in the neighbourhood of the town.

At Pembroke we spent a few days, and found in and about

Pembroke Castle Ruins.

Linaria Cymbalaria.
Calamintha officinalis.
Cheiranthus Cheiri.
Antirrhinum majus.
Linaria vulgaris.
Centranthus ruber.
Rumex pulcher.
Ceterach officinarum.
Petroselinum segetum.
Coronopus didyma.
Pyrethrum Parthenium (ray-less).
Orobanche Hederæ.
Festuca Myurus.
Conium maculatum.
Arabis hirsuta.

Quite a different series from the list given for St. David's, whereas,

On Haverfordwest Castle,

Diplotaxis tenuifolia.
Cheiranthus Cheiri.

were the only two noticed in passing.

Along the Salt-water Creek below Pembroke.

Statice rariflora.
S. Dodartii ?
Artemisia maritima.
Inula Conyza.
Dipsacus sylvestris.
*Centranthus ruber.

Aster Tripolium.
Glaux maritima.
Chenopodium maritimum.
Erigeron acris.
Helminthia echioides.
Malva moschata.
Arabis hirsuta.
*Clematis Vitalba (not native).

Near the "Eligug Stacks."

Statice Dodartii.
Picris hieracioides.
Erodium maritimum.
Lavatera arborea.
Inula crithmoides.
Calamintha officinalis.
Centaurea Scabiosa (cliff at St. Gowan's).

In the Gower Peninsula.

Helianthemum canum.
Geranium sanguineum.
Clinopodium vulgare.
Inula Conyza.
Viola hirta.
Erodium maritimum.
Inula Helenium.
Agrimonia odorata.
Rubia peregrina.
Carduus crispus.
Arctium intermedium.
Pyrus Aria.
Ligustrum vulgare.
Solanum Dulcamara.
Hyoscyamus niger.
Cornus sanguinea.
Lithospermum purpureo-cæruleum.

On the west wall of Pennard Castle we had no difficulty in finding the neat little rosettes of *Draba aizoides*. The whole district appeared to be very rich in calcareophilous species; and I was quite surprised to meet with *Agrimonia odorata* at Oxwich Bay, the only time that I have gathered it on a limestone soil.

Helianthemum canum occurs both at Langland Bay and at the Worms Head. *Lathyrus sylvestris* still flourishes on the cliff in Caswell Bay; and near the Mumbles I saw again the same *Statice* which grows so abundantly near the Eligug Stacks, and with *S. rariflora* on the gravelly shores of the creek at Pembroke, and which, in its dense spikes and usually the absence of barren branches, seems to agree better with *S. Dodartii* than with *S. occidentalis*.

SOUTH BEDFORDSHIRE MOSSES.

By James Saunders.

Of each gathering of Mosses on which this record is founded, specimens have been forwarded to Mr. H. Boswell, who has critically examined and named them, so that the nomenclature of the following list is essentially his. My grateful acknowledgments are due for the aid thus willingly rendered. In addition to this, duplicates of many of the critical species have been forwarded to Messrs. Anslow, Bagnall, Braithwaite, Hobkirk, and West, by whom any

error in making up the packets would be detected. The whole of the specimens have been gathered since January, 1882.

Sphagnum acutifolium Ehrh., and var. *tenue* Braith. Rare. Aspley Heath Wood. — *S. fimbriatum* Wils. Locally abundant. Flitwick Marsh, *cum fructu* 1882. Mermaid's Pond, Aspley, *c.f.* 1883. —*S. intermedium* Hoffm. Rare on Flitwick Marsh; abundant in Aspley Heath Wood. — *S. cuspidatum* Ehrh., var. *plumosum.* Very local. Mermaid's Pond. — *S. squarrosum* Pers. Only observed on Flitwick Marsh, where it assumes various forms, some close and compact, an inch or two high, others elongated to upwards of a foot, *c.f.* 1882–83. — *S. squarrosum* var. *imbricatum* Schpr. Very rare. Flitwick Marsh, *c.f.* 1882–83.—*S. cymbifolium* Ehrh. Plentiful on Flitwick Marsh and in Aspley Woods. — *S. cymbifolium* var. *squarrosulum* Nees. Rather rare. Flitwick Marsh.

(In addition to the foregoing, *S. acutifolium* var. *deflexum*, *S. subsecundum*, vars. *contortum* and *auriculatum*, *S. tenellum*, *S. rigidum* var. *compactum*, *S. cymbifolium* and var. *congestum*, all occur between Little Brickhill and Aspley, a few hundred yards from the county boundary. *S. molle* was also gathered in the same place about seventeen years since by the Rev. H. Crouch. Diligent search has recently been made for this species by both Mr. Boswell and myself, but without success.)

Weissia viridula. Common.—*W. cirrhata.* Local. Dunstable Road; Flitwick; New Mill End.

Dicranella varia Hedw. Local. Luton Downs; Dunstable Downs. —*D. cerviculata* Hedw. Rare. "Flitwick, Rev. H. Crouch, 1882." —*D. heteromalla* Hedw. Common.

Dicranum montanum Hedw. Very rare. On three oak trees near Mermaid's Pond, Aspley Woods.—*D. scoparium* L. Frequent. —*D. majus* Turn. Very local. Steppingley Firs. — *D. palustre* Bry. Brit. Local. Aspley; Clophill; Warden Hills *c.f.* 1883.

Campylopus flexuosus Brid. Local. Aspley Woods.

Leucobryum glaucum L. Local. Aspley Woods.

Pleuridium nitidum Hedw. Clophill.—*P. subulatum.* Common.

Phascum rectum Sm. Local. Luton Downs.

Pottia minutula Schewg. — *P. lanceolata* Dicks. Local. Luton Downs.—*P. intermedia* Turn. Local. Warden Hills.

Didymodon rubellus B. & S.

Ditrichum flexicaule Schweg. Local. On Chiltern Hills. Barren.

Trichostomum tophuceum Brid. Local. Chiltern Hills.

Barbula muralis L.—*B. fallax* Hedw. — *B. fallax* var. *brevifolia* Wils. Rare. Pepperstock.—*B. subulata* L.—*B. ruralis* L.—*B. intermedia* Brid.—*B. lævipila* Brid.

Ceratodon purpureus L.

Grimmia pulvinata Dill.

Orthotrichum affine Schrad.—*O. diaphanum* Schrad.—*O. Lyellii* H & T. Local. Pepperstock.

Physcomitrella patens Hedw. Southill Park.

Physcomitrum pyriforme L. Abundant on the mud thrown out of the River Lea, spring of 1882.

***Funaria hygrometrica* L.**

Philonotis fontana L. Local. Flitwick Marsh; a bog, Heath and Reach.

Bartramia pomiformis L. Local on sandy soil. Flitwick; Aspley.

Leptobryum pyriforme L. Rare. Deodorizing Works, Luton.

Webera nutans Schreb. Local. Flitwick Marsh.—*W. carnea* L. Local. Totternhoe; Southill.

Bryum atropureum W. & M. Local. Cemetery walls, Luton.—*B. cæspiticium* L.—*B. argenteum* L.—*B. capillare* L.—*B. roseum* Schreb. Rare. Aspley, Mr. C. F. Boultbee.

Mnium affine Bland. Rare. Totternhoe.—*M. undulatum* Hedw. —*M. hornum* L. — *M. rostratum* Schrad. — *M. punctatum* Hedw. Local. Clophill.

Aulacomnium androgynum L. Local. Aspley Woods. — *A. palustre* L. Rare. Flitwick Marsh, *c. f.* 1882.

Tetraphis pellucida L. Local. Flitwick; Aspley, *c. f.* 1882.

Atrichum undulatum L.

Pogonatum nanum Neck.—*P. aloides* b. *minus* Bry. Eur. Rare. Aspley Woods. — *P. urnigerinum* L. Rare. Luton Hoo Park, *c.f.* 1882.

Polytrichum formosum Hedw. — *P. piliferum* Schreb. — *P. juniperinum* Willd. — *P. commune* L. Very local. Flitwick; Aspley Woods.

Fissidens bryoides Hedw.—*F. adiantoides* Hedw.—*F. taxifolius* L.

Fontinalis antipyretica L. Locally abundant. In fine fruit in ponds at Limbury and Harlington, 1882.

Leucodon sciuroides L.

Antitrichia curtipendula L. Local. Barton; Harlington.

Neckera crispa L. Local. Chiltern Hills.—*N. complanata* L. A few capsules, Luton Hoo Park, 1882.

Homalia trichomanoides Schreb.

Anomodon viticulosus L. Abundant, but barren.

Thuidium tamariscinum Hedw. In fine fruit, Luton Hoo Park, October, 1882.

Thamnium alopecurum L.

Climacium dendroides L.

Isothecium myurum Poll,

Homalothecium sericeum L.

Camptothecium lutescens Huds., *c. f.* Chiltern Hills, Nov., 1882.

Brachythecium glareosum B. & S. Abundant on the Chiltern Hills. Barren.—*B. albicans* Neck. In fine fruit on thatch, Harlington, March, 1883.—*B. velutinum* L.—*B. rutabulum* L.—*B. rutabulum* L, var. *longisetum*, Bry. Eur. Local. The Marslets; Luton Downs.

Eurhynchium myosuroides L. Rare. On an oak tree, Dunstable Road, near Luton. — *E. striatum* Schreb. — *E. piliferum* Schreb. Barren.—*E. Swartzii* Turn., *c.f.* Luton Downs, November, 1882.—*E. prælongum* Dill.

Rhynchostegium confertum Dicks. — *R. murale* Hedw. Rare. Hockliffe.—*R. ruscifolium* Neck., *c.f.* Luton Hoo Waterfall, 1882.

Plagiothecium denticulatum L. — *P. denticulatum* var. *aptychus*

Spruce. Rare. Pepperstock.—*P. undulatum* L. Local. Aspley, Dr. Adams.

Amblystegium serpens L. — *A. riparium* L. Elongate forms, six inches long, in fruit at Limbury, 1882.

Hypnum aduncum Hedw. Rare.—Flitwick. — *H. Kneiffii*, Bry. Eur. Locally abundant. Limbury; Flitwick. Barren. — *H. exannulatum* Gümb. Rare. Flitwick.—*H. Sendtneri* Schpr. Rare. Totternhoe Mead. — *H. fluitans* L. Not uncommon. In fruit, Flitwick Marsh, 1883. — *H. filicinum* L. Abundant; *c.f.* by a rivulet, Limbury, 1882.—*H. commutatum* Hedw. Local. Sharpenhoe; Hockcliffe.—*H. cupressiforme* L. b. *tectorum* Schpr., c. *filiforme*, Bry. Eur.—*H. cupressiforme* d. *ericetorum*, Bry. Eur. Local. Aspley; Chiltern Green.—*H. resupinatum* Wils.—*H. molluscum* Hedw., *c.f.*—*H. patientiæ* Lindb. Local. Pepperstock; Luton Hoo.—*H. chrysophyllum* Brid. Local. Chiltern Hills.—*H. stellatum* Schreb. Local. Limbury; Heath and Reach.—*H. cordifolium* Hedw. In fruit, Flitwick March, 1883, C. Hamson and J. S. — *H. cuspidatum* L. — *H. Schreberi* Ehrh. — *H. purum* L. — *H. stramineum* Dicks. Rare. Flitwick Marsh.

Hylocomium splendens Dill. — *H. triquetrum* L. — *H. squarrosum* L.; *c.f.* Luton Hoo Park, 1882.

The foregoing moss list is practically the first for South Beds., as Abbott's Flora has no localities further south than Barton Hills, which are nine or ten miles from the extreme south of the county. In addition to the preceding the following have been found in the north of Bedfordshire.

Encalypta vulgaris Hedw. Oakley, Mr. Davis.

Fissidens crassipes and *Cinclidotus fontinaloides* Hedw. On submerged masonry, Bramham.

Cryphæa heteromalla Hedw. Turney, Rev. H. Higgins.

Rhynchostegium tenellum Dicks. Near Bedford, Dr. Adams.

THE SEEDS OF *ANTHOXANTHUM*.

By William Carruthers, F.R.S.*

Sweet Vernal Grass (*Anthoxanthum odoratum* L.) is one of the most widely distributed of our indigenous grasses. . . . It is a perennial, and deserves a place, though not an important one, in permanent pastures.

But the benefits it may give to a pasture are entirely wanting from the allied species, the seeds of which are very largely sold in its stead. This plant, *A. Puelii* Lec. & Lam., is an annual grass, found throughout Central and Southern Europe, and extending as far north as Holland and Belgium; but whether in these two countries it is an introduced or an indigenous plant I have not the means of determining. It is a smaller and more delicate grass,

* Reprinted by permission from the Journal of the Royal Agricultural Society, 1883.

branching very freely from the root, and producing a large number of flowering stems. The plant has scarcely any odour, either when green or dried. The foliage is small, and not abundant. The substitution, therefore, of its seeds for the perennial Sweet Vernal Grass is a serious injury, and the increasing proportion of samples that have during the year come under my notice prove that this adulteration is on the increase.

The introduction of *A. Puelii* by seedsmen, and its extensive presence in mixtures for laying down new pastures and improving old ones, has led to its appearance over the country in such a way as to puzzle botanists, and to lead to the notion that it is an indigenous grass, which had been overlooked until a few years ago. It was first noticed by Mr. Britten in 1872, at Mobberley, in Cheshire, in a field which had been broken up and re-sown with grass some years before. It was next observed by Mr. Townsend, in 1874, in a gravelly field near Netley, in Hampshire; and since

a *b* *c*

FIG. 1.—*Anthoxanthum odoratum* Linn. Ten times the natural size. *a*, the seed with its shining striated scales; *b*, one of the hairy pales, with the jointed hygrometric awn, covered with hairs, and with curved edges, and an even apex; *c*, the "seed" as offered for sale, consisting of the two pales surrounding the small shining seed, which is seen between the open edges of the pales.

then it has been recorded from Staffordshire, Worcestershire, Devonshire, and other places. But in none of the localities is its appearance free from the strong suspicion that it has been intro-

duced with agricultural seeds. Mr. Townsend gave a figure and description of the plant in Journ. Bot. 1875, p. 1, t. 157.

The seeds of the two grasses very closely resemble each other, yet they possess differences which may be detected when they are carefully examined. As offered for sale, the seeds are not naked like those of wheat, but are still covered by two sets of leafy envelopes. They are oblong and more or less hairy bodies, with two hygrometric awns, one being kneed, and the other shorter and straight. The small seed is easily freed from the outer coverings, and it is found to be an oval brownish body, with a shining coat. The coat consists of two thin striated scales, which are so closely wrapped round the seed that it is very difficult to remove them. When the grass is in flower the scales are more open, and the stamens spring from within them. The hairy awned pales are

a *b* *c*

FIG. 2.—*Anthoxanthum Puelii* Lec. & Lam. Ten times the natural size. *a*, the seed with its shining striated scales; *b*, one of the pales, with the jointed hygrometric awn, the hairs along the nerves and margins, and with straight edges and toothed apex; *c*, the "seed" as offered for sale, consisting of the two pales, completely enclosing the seed.

believed to be aborted florets, one on either side of the central fertile floret, which produces the seed; and the three florets are enclosed in two unequal-sized white chaffy glumes, which

remain attached to the flowering stalk when the seeds are ripe. This description applies equally to the seeds of all species of *Anthoxanthum*.

The differences between the seeds of the Sweet Vernal Grass and the annual species employed to adulterate it are not very obvious, yet, when accurately apprehended, they can easily be detected. In the bulk the seeds of the true Vernal Grass are darker in colour than those of the other species. The most important characters for distinguishing them are to be seen in the hairy pales or barren florets. In the Sweet Vernal Grass the pales are narrowed or hollowed out in the middle, so that, while they overlap at top and bottom, they leave a narrow oval space in the middle, through which the glistening surface of the seed may be seen. In *A. Puelii* the pales are quite straight-sided, and entirely cover the seed. This difference may be seen in the aspect of the complete seed as offered for sale — figs. 1 *c* and 2 *c*, but perhaps better in the drawings of the separate glumes of each species, figs. 1 *b* and 2 *b*. In the Sweet Vernal Grass the enlarged apex of the pale is evenly rounded, and the edge is uniformly and finely serrate; while in the allied species the apex has two or three irregular teeth. And further, the hairs on the pales of the Sweet Vernal Grass are scattered irregularly over the surface, while in the other species they are in lines along the midrib and veins, and along the edges. Finally, the seeds free from the hairy pales of the Sweet Vernal Grass are longer and narrower, and darker in colour than those of *A. Puelii*. In both the outer scale is very large, completely covering the seed and the smaller inner scale. The white seed is of the same form, when denuded of the scales.

NEW PLANTS FROM THE ZAMBESI COUNTRY.

By J. G. Baker, F.R.S.

In a box of plants collected by Sir John Kirk in the Zambesi Country in 1859, which has only just come to hand, are fine specimens of a great Aloe allied to *A. abyssinica* and *succotrina*, of which we possessed previously such very imperfect fragments that I did not venture to characterise it. The new box contains as full and complete material as can reasonably be expected of any Aloe in a dried specimen, and from this the following description has been made:—

Aloe cryptopoda, n. sp.—Leaves ensiform, at least 2 ft. 3 in. broad at the base, tapering gradually to the point, margined with close spreading deltoid teeth 1-12th in. long and broad, six or eight to an inch. Inflorescence long-peduncled, simple or forked; flowering racemes moderately dense, 6–9 in. long; bracts orbicular-cuspidate, scariose, distinctly many-nerved, ½ in. long; pedicels as long as the bracts, articulated at the tip. Perianth cylindrical, bright red, ⅞–1 in. long, cut down to the base into lanceolate seg-

ments. Stamens and style not protruded. Capsule ellipsoid, under an inch long.

Hab. Banks of the Zambesi opposite Senna, July, 1859, *Sir John Kirk*.

Its place in the sequence of species in my monograph in Journ. Linn. Soc., vol. xviii., is after No. 62.

The same parcel also contains a very fine new *Notochlæna* from the high mountains of the interior, allied to the Mexican and Andine *N. squamosa* Fée.

8*. **Notochlæna lepigera**, n. sp. — Rootstock erect. Basal scales lanceolate, membranous, dense, very pale brown, $\frac{1}{6}$–$\frac{1}{4}$ in. long. Stipes densely tufted, flexuose, 2–5 in. long, pale brown, laxly scaly. Lamina oblanceolate-oblong, bipinnate, 1 ft. long, 2 in. broad, narrowed gradually from the middle to the base, greenish and slightly pilose above, covered all over beneath with large imbricated lanceolate membranous whitish-brown paleæ like those of the rootstock. Pinnæ sessile, lanceolate, obtuse, the central ones the longest, 1–1$\frac{1}{4}$ in. long, $\frac{1}{3}$ in. broad; the lower ones distant and very small. Pinnules oblong, obtuse, sessile, crowded, closely dentato-pinnatifid. Sori placed all round the outer margin of the pinnules.

Hab. Dzanba, Zambesi-land, alt. 6000–7000 ft., *Sir John Kirk*.

A FORGOTTEN NATURALIST.

The biographies of Thomas Edward and Robert Dick, for which we are indebted to the facile pen of Dr. Smiles, and the life of William Duncan, which we owe to Mr. Jolly, must have made many wonder whether Scotland stood alone in the three kingdoms in possessing men of this type. Ireland is—as we might expect from its past history—far behind in matters of this kind; and it would be difficult to find, or even to kindle in the working man of that country, whose interest centres in politics rather than in science, any enthusiasm for the facts of Natural History; but England has not been unproductive of such men, although no one has hitherto devoted a volume to the history of any one of them. Mr. George M. Arnold, however, has come forward to break the silence, and has published a biography of Robert Pocock, "the Gravesend historian, naturalist, antiquarian, botanist, and printer," last year, which attracted less notice than its own merits or its subject deserve.

Robert Pocock was born at Gravesend, Feb. 21, 1760. He was educated at the Free School, and was probably errand boy to his father, who had a grocer's shop in the town. His father died in 1772, and in 1779 Robert married. In 1786 he established a printing-press and collected a library for the use and benefit of his native town—the first of either which was known in Gravesend. "Impressed with the absence of elementary works,

he at an early period turned his attention to the more easy instruction of children in the rudiments of spelling and reading." His 'Child's First Book, or Reading made Easy,' which was soon followed by 'The Child's Second Book,' had a large circulation, and "speedily superseded the ancient horn-books." His wife dying in 1791, he married again at the end of the following year, his second wife, with whom he did not live happily, being above him in social position. In 1812 he founded the Natural History Society of Kent, of which he was chairman, the first meeting being held at Northfleet on July 13th, when twenty-one persons were present.

Pocock was a man of great industry, and devoted himself in turn to a variety of subjects. Our interest in him centres in his botanical attainments, but he either published or prepared for publication works on biography, topography, and natural history, as well as two guide-books to parts of the River Thames, and a pamphlet entitled 'The Sea Captain's Assistant.' The greater part of Mr. Arnold's volume consists of Pocock's diaries, beginning in 1811 and extending, with some gaps, to 1823, and these are full of records of "phenological phenomena," to use the modern phrase, as well as abounding in shrewd comments upon things in general. On Sept. 15, 1811, he visited Crayford, where he "found that madder was lately cultivated, but now totally rooted up, it being a losing concern, as it took three years to bring it to perfection and much trouble in getting up the roots, which run four or five feet in

length." On March 29, 1812, he notes, "travelled to Hollow Dean Field, Sutton, and got four or five roots of the lizard orchis, now four or five inches high." This rare plant figures not unfrequently. On June 30th he carried a specimen to "Esq. Russel" at Swanscombe; "walked in his garden and found him well skilled in botany; his garden having above a thousand plants in it." In 1822 Prof. Henslow visited him more than once; Pocock describes him as "a pleasant young man and worthy his professorship"; they arranged and effected an exchange of rare plants. On the 2nd April, 1823, he "went to Wilmington, and got five or six roots of the lizard orchis, all of which must have grown in the two last years, as when I was there in 1821, in March, only one root was left." These he planted out a week afterwards in hedge-banks in his neighbourhood. One he planted later in Shinglewell Lane, "to remain as a breeder; these roots are very scarce, and I want to propagate them." This planting out of rare species as "breeders" seems to have been a common practice with him.

At the end of Mr. Arnold's volume is a list of "rare plants found by R. Pocock in the vicinity of Gravesend," in which are some errors—e.g. *Echinophora spinosa*. Of greater interest is his herbarium, which, at the instance of the Editor, Mr. Arnold has very kindly procured for the Botanical Department of the British Museum, where it will be always available for reference. In its present condition it consists of two folio volumes, which when acquired by Pocock, contained a miscellaneous collection of cultivated plants of no value; the blank spaces in these books were filled up by Pocock with his own specimens, most of which are named and localised. He afterwards started a collection in five quarto volumes. Thus the whole seven volumes containing these specimens, to each of which a printed label bearing Pocock's name will be affixed, will be incorporated with the large historical collection of British plants already in the Museum, which has recently been rendered still more valuable by the acquisition of Hugh Davies's herbarium. To Pocock's biographer also, we are indebted for the use of the portrait of Pocock, given above, which forms the frontispiece to his volume.

SHORT NOTES.

Apium graveolens Linn., in Huntingdonshire.—In rejecting this as a native of Co. 31, Mr. Watson says ('Topographical Botany,' ed. 2. p. 189)—"All inland localities for this much-cultivated littoral plant must be regarded with suspicion." Now Huntingdonshire, though it has no present coast-line, is still subject to the incursion of the tide up the Ouse as high as Bluntisham Stanch, and the claylands of Somersham, Warboys, Sawtry, and Holme form a considerable part of the western and southern shores of the ancient sea, which formerly covered the great level of the Fens. Naturally, traces of the old maritime flora may be expected, and actually

exist, in and around the Fens; and therefore plants which must be regarded with suspicion in the ordinary inland stations, here have higher predial claims. Hence, when finding such plants as *Scirpus maritimus*, *Carex distans*, *Rumex maritimus*, *Apium graveolens*, *Bupleurum tenuissimum*, and *Gastridium lendigerum*, established on the islands and shorelands of the old fenland sea, we may regard them rather as true natives than as accidental introductions. *Apium graveolens* grows in Ramsey Fen along with *Scirpus maritimus*, and from thence it may be traced, up highland watercourses, frow Wistow to Great Stukely,—Ray's station for *Bupleurum tenuissimum*—where it is accompanied by *Carex distans*. Under ordinary circumstances, we should consider the plant had been carried by the natural flow of water from the higher to the lower station; but, having regard to its distribution throughout the whole fenland, we know such has not been the case, though, on the other hand, it may have ascended the stream. A very natural means of such *reverse* distribution will suggest itself to everyone who has watched the habits of wildfowl in the Fens. As soon as the floods of winter cover the washes, vast flights of sea-birds are attracted from the coasts of Norfolk and Lincoln by the abundant supply of food afforded by the newly drowned lands. But on the first approach of frost, which quickly seals up the shallow, almost stagnant flood, these flights are driven, not back to the sea, but dispersedly, in small parties, up the running brooks and spring-fed bogs of the neighbouring highlands. In this way Stukely may have got its shoreland plants; Lutton, in the Isle of Ely, its *Bupleurum tenuissimum*, *Juncus compressus*, and *Apium graveolens*; and Monks Wood its colony of *Gastridium lendigerum*.—Alfred Fryer.

Middlesex Plants.—The authors of the 'Flora of Middlesex' append a list of plants which, once known to exist in the county, have since died out, and are now presumably extinct. No doubt the greater number of these are lost to us, but certainly not all, for, in addition to *Rumex maritimus*, already shown to exist in some quantity in our neighbourhood, I have found *Dianthus Armeria* in a lane not far from Hayes; *Trigonella ornithopodioides* on Uxbridge Common; and *Trifolium scabrum* in the gravel-pits on Hillingdon Heath. *Ranunculus parviflorus* and *Sagina nodosa* are referred to as not having been recently met with, but I have gathered the former (growing with *Cynoglossum officinale*) on the canal embankment near Cowley, and the latter—so lately as November last (growing with *Ranunculus hirsutus* and *Alchemilla vulgaris*)—on the moors about two miles and a half north of Uxbridge. These are neither large nor important additions to the county flora, but they suggest that, if some three or four "extinct" species can be found within an area of two or three miles, a patient search in other quarters would be rewarded by the re-discovery of others of their number.—John Benbow.

NOTICES OF BOOKS.

The Flowering Plants and Ferns of the County Cork, with coloured Map and Introduction by the Rev. Thomas Allin. Weston-super-mare: J. Marche. 1883.

Local floras of Ireland are so few that any addition to their number is welcome. It is forty years since Dr. Power drew up his 'Botanist's Guide to the County Cork.' Many important additions have been made since that time, especially through the labours of the late Mr. Isaac Carroll, who during his long residence at Cork devoted the greater part of his leisure to a careful study of the flora of his county. To the lifelong labours of this industrious botanist the value of the present volume is in great measure due. Mr. Allin has added the results of his own researches; and we believe that his book offers a fairly complete list of the plants of the county. The number of 700 species is rather more than might have been expected, and is no doubt owing to the southern position and proximity to the European continent, much more than to the climatal condition to which Mr. Allin has justly drawn attention. He has very judiciously cleared the list of a large number of doubtful natives, which had been too easily admitted by Dr. Power, and corrected many errors. It would be interesting if a comparison had been drawn with the adjacent counties of Kerry and Waterford, and we could wish that Mr. Allin had done this in detail.

It is a matter of regret that no room has been found for the cryptogamic plants, especially the mosses and lichens, for which we believe the materials exist; and it is remarkable that Mr. Allin should have omitted the *Equisetaceæ*, *Lycopodiaceæ*, &c., which comprise some of the most interesting of the Cork species.

The short but interesting historical preface suggests one or two remarks. It would probably have extended the work beyond the limits designed by Mr. Allin had the earlier lists been reprinted in full; but we should have been glad of a reprint of Dr. Smith's list, from his 'Ancient and Present State' of the county (Dublin, 1770), with some indication of the confirmation or otherwise of the numerous localities contained in it. We may say the same of the list contributed by James Drummond in 1818–20, to the 'Munster Farmer's Magazine'; while if, as we suppose, the catalogues drawn up by Dr. Scott and Mr. H. T. Alexander, and presented by them to the Cuvierian Society of Cork, are unpublished, they might well have been included; we should like also to know more of the "Series of MSS. Botanical Notes on Cork plants," drawn up by Dr. Hincks. At the least, it seems to us that the present whereabouts of these lists should have been clearly stated, for the benefit of future workers.

Considering the extent of the county, we should have thought a larger number of districts might have been made. Mr. Allin has only two, and these do not correspond with those in 'Cybele

Hibernica,' which we venture to think should have been retained, unless a larger number were adopted. A few matters for criticism occur to us as we turn over the pages. Thus, of the plants mentioned as "confined to Co. Cork, in Ireland," *Helianthemum guttatum*, as represented by its variety *Breweri*, occurs in Bofin; *Geranium rotundifolium* grows at Glasnevin; *Rosa systyla* is marked in the body of the book as "probably introduced"; and *Euphorbia amygdaloides* occurs in Donegal: these are all published in the Supplement to the 'Cybele Hibernica.' *Elatine Hydropiper* and *Salix laurina* var. *tricolor*, mentioned as Cork plants in the Introduction, are treated as errors later on in the volume. A note by Mr. Carroll that *Senecio squalidus* "hybridizes freely at Cork with *S. vulgaris*" is of interest, and we should have been glad of a fuller account of the hybrid. The broad-leaved variety of *Erythræa Centaurium* is not the same as *E. latifolia* Sm. *Orchis incarnata* may be added to the list; it was found by the writer of this notice in company with Mr. Nicholson, in a meadow near the sea at Youghal, in 1882.

These criticisms of details in no way interfere with a full recognition of the usefulness of Mr. Allin's work, as a valuable contribution to the new 'Cybele Hibernica,' upon which we are glad to know that Mr. A. G. More is actively engaged. A word of praise must also be given to the printing and general get-up of the volume, which is certainly creditable; the number of misprints is singularly few, although work of this kind must be a tax upon the patience and the resources of an ordinary country printer. We think many English botanists will share the regret which we feel on learning that the number of copies for sale—for which application should be made to the publisher—is very limited.

J. B.

The fifth fascicle of Maximowicz's "Diagnoses plantarum novarum asiaticarum" has just appeared in the 'Mélanges Biologiques,' and is one of the most interesting of the series. Besides a few scattered notes and descriptions of new species the pamphlet includes a synopsis of the genus *Isopyrum*: *Menispermum* of Eastern Asia; Eastern Asiatic species of *Prunus*; Central Asian species of *Saxifraga*; *Crassulaceæ* of Eastern and neighbouring Central Asia; certain Eastern Asiatic *Rubiaceæ*; synopsis of *Ajuga* sect. *Bugula*; Eastern Asiatic species of *Euphorbia*; and some *Liliaceæ* of Eastern and neighbouring Central Asia. An index is given of the new genera and species described in the five fascicles of the Diagnoses, but it may be hoped, in the interests of Asiatic botany, that this does not imply that this invaluable book has been brought to a close.

The last part (vol. iii.) of the 'Annuario della R. Scuola superiore d'Agricoltura in Portici,' contains "Reliquie Micologiche Notarisiane," by Prof. O. Comes.

We have been vainly endeavouring to find space for an adequate notice of the indefatigable Baron von Mueller's important contribution to botanical literature, entitled 'Systematic Census of Australian Plants, with Chronologic, Literary and Geographical Annotations.' This is compressed into 152 quarto pages, each species occupying only a line, in which is given name, authority, place and date of publication, distribution in Australia, and references to Bentham's 'Flora Australiensis,' and Mueller's 'Fragmenta.' The history of the genera is given in a similarly concise and complete manner. The result, as might be expected, is to bring into prominence several generic names which had fallen into disuse, and the restoration of which—as for example *Candollea* for *Stylidium*—may cause some temporary inconvenience, although we agree with the Baron that "the impartial rules of strict priority" are the only safe ones. From the same author we have a 'List of the Plants indigenous around Sharks Bay and its vicinity,' a locality which has been known to botanists since the days of Plukenet.

In 'The English Flower Garden,' lately published by Mr. Murray, Mr. W. Robinson has produced a handsome volume, forming a compendious summary of all that pertains to the garden. Some hundred and twenty pages are devoted to such matters as position and style, the various classes of plants recommended, notes on bedding, the distribution of colour, and the like. The second and larger portion of the book is occupied by "a description, alphabetically arranged, of all the plants best suited for its embellishment, their culture, and positions suited for each," and is carefully done, though we note a slip here and there, as when the flowers of *Hydrocharis* are described as yellow. The volume is beautifully printed and fully illustrated, the figures being very unequal in merit.

New Books.—Battandier & Trabut, 'Flore d'Alger . . . . Monocotylèdones' (8vo, pp. xvi., 211, Alger, Jourdan).—A. Delteil, 'La Vanille, sa culture et sa préparation' (8vo, pp. 58; tt. 2: Paris, Challamel ainé).—G. Dragendorff, 'Plant Analysis' (Trans. by H. G. Greenish: Baillière: 8vo, pp. xvi., 280).—W. Robinson, 'The English Flower Garden' (8vo, pp. cxxiv., 303: Murray: 15*s*.) —J. F. Duthie, 'List of Grasses of N.-W. India' (4to, pp. 47: Roorkee).—T. Christy, 'New Commercial Plants' (No. 7; 8vo, pp. 98: Christy & Co.: 2*s*.).

Articles in Journals.—February.

American Naturalist.—C. E. Bessey, 'Hybridism in *Spirogyra*.' —J. B. Ellis & G. Martin, 'New Florida Fungi' (*Asterina intricata*, *Venturia cupulata*, *V. applanata*, *V. saccardioides*, *Linospora ferruginea*, *Phyllosticta terminalis*, *Septoria Serpentaria*, *Pestalozzia myricæ*, *Helminthosporium fumosum*, spp. nn.).

Ann. Sciences Nat., 6th S. vi., No. 6 (Dec.).—A. Franchet, 'Plantes du Turkestan' (contd.: *Cousinia coronata* (t. 18), *C. outichaschensis*, *C. integrifolia*, *C. canescens*, *C. princeps*, *Centaurea turkestanica*, *Jurinea Capusi*, *Serratula spinulosa*, *Koelpinia scaberrima*, *Scorzonera racemosa*, *S. turkestanica*, *S. acanthoclada*, spp. nn.).—C. Naudin, 'Mémoire sur les Eucalyptus introduits dans la région méditerranéenné.'

Bot. Centralblatt (nos. 1–4).—E. Heuser, 'Beobachtungen über Zellkerntheilung' (2 plates).

Botanische Zeitung (Jan.).—J. Reinke, 'Untersuchungen über die Einwirkung des Lichtes auf die Sauerstoffausscheidung der Pflanzen' (1 plate).

Bull. Torrey Club (Dec.).—E. L. Green, 'New Western Plants' (*Draba asprella*, *Polygala Rusbyi*, *Cotyledon Rusbyi*, *Œnothera divaricata*, *Bigelovia tridentata*, *B. acradenia*, *Antirrhinum Kellogii*, *Pentstemon Kleei*, spp. nn.). — C. H. Park, 'New Genus of Sphæriaceous Fungi' (*Neosphæria* Sacc. = *Sphæria Coulteri* Peck.) — G. Vasey, 'New Grasses' (*Agropyrum Scribneri*, *Sporobolus Buckleyi*, spp. nn.)

Flora (Jan. 1–21).—K. B. J. Forselli, 'Lichenologische Untersuchungen.' — A. Geheeb, 'Bryologische Notizen aus dem Rhöngebirge.'

Garden (Jan. 19).—*Bessera elegans* (ic. pict.).

Gardeners' Chronicle (Jan. 5). — *Odontoglossum Dormanianum* Rchb. f., *Ismene Andreana* Baker, spp. nn. *Pinus Laricio* (fig. 1).—M. J. Berkeley, 'Vine Mildew' (*Uncinula spiralis* (fig. 3.).—(Jan. 12). *Sarcanthus Lendyanus* Rchb. f., sp. n.—M. T. Masters, *Pinus muricata* (figs. 7, 8, 9). — N. E. Brown, 'Rooting terminal buds of the Bramble' (fig. 10).—(Jan. 19). W. Watson, 'Notes on Nymphæas' (fig. 17).—(Jan. 26). *Pleurothallis elachopus* Rchb. f., n. sp.—M. T. Masters, *Cephalotaxus* (figs. 20–23) (*C. pedunculata*, var. *sphæralis*, nov. var.).

Midland Naturalist. — J. E. Bagnall, 'Flora of Warwickshire' (contd.: *Labiatæ*).

Oesterr. Bot. Zeitschrift.—Memoir of Adolf Weiss (portrait).—H. Zukal, 'Bacterien als directe Abkömmlinge einer Alge.'—J. B. Wiesbaur, 'Die Rosenflora von Travnik in Bosnien' (contd.)—R. F. Solla, 'Nachklänge aus Italien'—P. G. Strobl, 'Flora des Etna' (contd.)

Pharmaceutical Journal (Jan. 19). — J. Moeller, 'American Drugs' (*Micromeria Douglasii*).—H. Trimen, '*Cinchona Ledgeriana*.'

Science-Gossip.—W. T. Haydon, 'Notes on *Lathræa Squamaria*.'

Trans. Linnean Society of London, vol. 2, pt. 6.—H. Marshall Ward, 'Structure, development and Life-history of a tropical epiphyllous Lichen' (*Strigula complanata*), (4 plates.)

LINNEAN SOCIETY OF LONDON.

November 1, 1883.—Frank Crisp, Esq., Vice-President, in the chair.—Messrs. T. E. Gunn and A. Hutton were elected Fellows. —A donation to the Society of several interesting letters of Linnæus (1736–1769) to G. D. Ehret, the eminent botanical artist, was announced by the chairman, and an unanimous vote of thanks thereupon recorded to the Misses Grover and Mr. Charles Ehret Grover for their valuable donation.—Mr. H. Groves showed examples of *Chara Braunii* from Ashton-under-Lyne, and Mr. Arthur Bennett of *Najas marina* from Hickling Broad, Norfolk.—Mr. J. Starkie Gardner read a paper on *Alnus Richardsoni*, a fossil fruit from the London Clay of Herne Bay. The species has been described by Bowerbank, and commented on by Carruthers, Ettinghausen, and many other authors who have written upon the plants of the Tertiary formation. Originally considered as allied to *Casuarina*, Dr. Robert Brown suggested its affinities to the *Proteaceæ*, a view afterwards upheld by Carruthers and others. Ettinghausen thereafter regarded it as a product of a conifer (*Sequoia*), and Saporta compared the fruit to that of *Dammara*. Mr. Gardner enters fully into the structural peculiarities of the fossil fruit in question, and satisfactorily demonstrates that it belongs to the *Betulaceæ* under the genus *Alnus*.—A paper by Miss G. Lister was read, "On the Origin of the placentas in the tribe *Alsineæ* of the Order *Caryophylleæ*." This communication is based on a series of observations on the development of a number of genera and species. The author concludes that the capsule in the *Alsineæ* is developed on essentially the same plan as that of *Lychnis*, the difference in the various genera being merely dependent upon the relative height attained by the carpels on the one hand and by the central axis on the other. This being so, it follows that, if the carpellary origin of the placentas in *Lychnis* be accepted, the placentas in the *Alsineæ*, from *Sagina apetala*, which most resembles *Lychnis*, to *Cerastium triviale*, which most widely differs from it, are also carpellary.

November 15.—Sir John Lubbock, Bart., President, in the chair.—Messrs. P. Crowley and J. Murray were elected Fellows of the Society.—Mr. Chas. B. Plowright exhibited a young pear tree showing *Roestelia cancellata* Jacq., produced from *Podisoma sabinæ*, therefore supporting the observations of A. S. Œrsted, in 'Botaniska Notiser' for 1865; also examples of *Puccinia graminis* on wheat, produced from *Æcidium* on *Mahonia Aquifolium*; the æcidiospores were sown on June 2nd, 1883, the uredospores appeared June 10th, and the ripe *P. graminis* was gathered Sept. 10th, 1883. He likewise called attention to examples of *Æcidium rumicis* on *Rumex obtusifolius*, *R. Hydrolapathum*, *R. conglomeratus*, and *Rheum officinale*, the same being produced from *Puccinia phragmitis*.—Mr. T. Christy exhibited a fine living and healthy specimen of *Trevesia sundaica* Miq. (the so-called *Gastonia palmata*), or probably a new species. This peculiar and handsome plant has

rarely been seen in this country, and of late years almost been lost sight of.—Mr. F. I. Warner drew attention to a series of specimens of *Orchis incarnata* from Hampshire, wherein considerable variations in colouring were manifest.—A paper was read by Mr. A. W. Bennett, "On the reproduction of the *Zygnemaceæ*," as a solution of the question—is it a sexual character? De Bary, twenty-five years ago, and since then Wittrock, have instanced what they have deemed sexual differences between the conjugating cells, though most later writers rather ignore essential physiological distinctions. Mr. Bennett has directed his investigations chiefly to the genera *Spirogyra* and *Zygnema*, and from these he supports the inference of the above-mentioned anthors. He finds there is an appreciable difference of length and diameter in the conjugating cells, that deemed the female being the larger. The protoplasmic contents he also finds pass only in one direction, and change first commences in the chlorophyll bands of the supposed male cell, with accompanying contraction of the protoplasmic material. The genera *Mesocarpus*, *Staurospermum*, and the doubtful form *Craterospermum* have likewise been examined, and though showing differences, yet on the whole substantiate the view above enunciated of cell sexuality.

December 6. — Sir John Lubbock, Bart., President, in the chair.—H.H. Maharajah of Travancore, and Messrs. C. A. Barder, E. Bostock, H. Friend, J. Hannington, J. S. Hicks, J. Richardson, R. Tate, and H. Tisdall, were elected Fellows of the Society.—Mr. B. Daydon Jackson exhibited a specimen of "Mexican whisks," known also in the London market as "Chien-dent," which are now imported in considerable quantity from the vicinity of La Puebla, in Mexico. It is believed to be derived from an *Andropogon*, but is in bulk coarser than the similar material from Southern Europe, from *Andropogon Gryllus*, and finer than the species of *Panicum* used in India for brushes.—Mr. Arthur Bennett exhibited a specimen of *Carex ligerica*, gathered by Mr. Cunnack in Scilly (see p. 27). Mr. Bennett also drew attention to some masses of agglomerated larch leaves, found in the Shropshire Meres, and known locally as "vegetable hedgehogs."—Mr. Charles Darwin's paper on Instinct was then read.

December 22. — Alfred W. Bennett, F.L.S., in the chair.—Messrs. N. Cantley, W. Dobson, F. G. Smart, and the Rev. R. Thom, were elected Fellows of the Society.—A paper was read by Mr. F. O. Bower, "On the Structure of the stem of *Rhynchopetalum montanum*." The plant is a native of Abyssinia, growing in districts 11,000 to 13,000 ft. above the level of the sea. It differs from its ally *Lobelia* in being perennial. Internally it is succulent when young, but the surface becomes scarred as the leaves drop off, and exteriorly is hardened by a thick corky deposit. *Rhynchopetalum*, the author shows in detail, has certain peculiarities in the arrangement of the tissue of its leaf bundles, since the cortical system does not consist of branches of bundles of the leaf-trace, but are cauline bundles, in this respect differing widely from such forms as *Lathyrus*, *Casuarina*, many Begonias, &c. *Rhynchopetalum*, moreover,

has the cortical bundles running obliquely, and forming a regular four-sided meshed network related to the leaf bases and bundles of leaf-trace. In these respects it approaches *Cycas*, but in the latter the bundles of the accessory cortical system are not so regular, and are almost vertically arranged. Some Cycads and *Rhynchopetalum* also agree in the exterior appearance of their stem, so that palæontologists might be deceived in their judgment, if two well-preserved specimens were examined by them.—A paper on the Organs of Secretion in the *Hypericaceæ*, by Mr. J. R. Green, was read. He concludes, 1st, That the view advocated by Link, Martinet, and De Bary of the lysegenous origin of the reservoirs of ethereal oil in these plants is the correct one. 2nd, That there exists in many parts of these plants a series of ducts or passages, differing only slightly from these reservoirs, the differences being that they are not globular and isolated, but are generally connected more or less intimately with each other, and that their secretion is not a clear ethereal oil, but a viscid or resinous liquid; the points of agreement being those connected with their development and function. 3rd. That at least, in some species, there is also a series of schizogenous ducts confined to certain portions of the phloem. 4th. That the dark glands, which have been described, are in intimate relationship with the fibro-vascular system. 5th. That the formation of resin and kindred secretions in these plants, is confined to the parts where metabolism is active, and where there is a primary meristem; that all such parts give evidence of such formation, with the exception of the roots.—A paper, "On the glands of *Coprosma Baueriana*," by Walter Gardiner, was read. The so-called stipular body is placed immediately behind each leaf, and in the young condition the stipule arches over the leaf, and the glands with which it is provided secrete copiously a mucilaginous fluid which bathes and surrounds the young leaf structure. As to the development of the glands, they arise as protrusions of the stipule parenchyma, which are covered by an epidermis. Each epidermal cell then rapidly grows out at right angles to the protuberance. In *Coprosma* the glands are situated on the sides of the stipules, but it more usually occurs in other genera that they are distributed over the inner face of the base of the stipular organ.—The last paper taken was "On the Development of Starch Grains in the Laticiferous Cells of the *Euphorbiaceæ*," by Mr. M. C. Potter. It is pointed out, that while the discovery of the existence of starch-forming corpuscles had been made by Kruger, yet he had failed to interpret their function, which Mr. Potter's researches now fully proved in the case of the *Euphorbiaceæ*, where the development of rod or spindle-shaped grains of starch lying within cell protoplasm has been clearly demonstrated.

January 17, 1884.—Sir John Lubbock, Bart., President, in the chair.—Mr. A. S. Pennington was elected a Fellow of the Society.—Dr. R. C. A. Prior exhibited and made remarks on a series of useful timbers from British Guiana. These were all hard woods, among which may be mentioned the Greenheart (*Nectandra Rodiæi*); the "Ducalibolly," a rare red wood, used in the colony for furniture;

"Wamara," a very hard-wooded tree sixty feet high, used by the natives for clubs, &c.; "Letter-wood" (*Brosimum Aubletii*), useful for inlaying and making very choice walking-sticks; "Heyowabolly" (*Omphalobium Lamberti*), a rare tree of twenty feet high, known commercially as Zebra-wood. — Mr. H. N. Ridley drew attention to a fasciated branch of holly from Herefordshire, in which certain of the leaf-branches were curiously interwoven.—Dr. Murie called attention, on behalf of Mr. Frederick Piercy, to a presumed portrait of Linnæus in oil, doubtfully supposed to be an original.—A paper was read by Mr. J. G. Baker, *viz.*, "A Review of the Tuber-bearing Species of *Solanum*." As they stand in DeCandolle's 'Prodromus' and other botanical works, the tuber-bearing Solanums are estimated as belonging to twenty distinct species. Mr. Baker thinks that not more than six of those are really distinct, viz.:—(1) *Solanum tuberosum*, a native of the dry high regions of the Andes from Chili northward to Venezuela, reappearing in other varieties in Mexico and the Rocky Mountains; (2) *S. Maglia*, an inhabitant of the damp coasts of Chili as far south as lat. 44° to 45°; (3) *S. Commersoni*, a low-level plant of Uruguay, lately introduced as a novelty under the name of *S. Ohrondu*; (4) *S. cardiophyllum*, a little-known species from the Mexican highlands; (5) *S. Jamesii*, a native of Mexico and the Rocky Mountains; and (6) *S. oxycarpum*, a native of Central Mexico. The two last have the tubers very small. All our cultivated races of potato belong to *S. tuberosum*; but the plant gathered by Darwin in the Chonos Archipelago and that experimentised upon by Sabine at Chiswick are both *S. Maglia*. The author attributes the deterioration of the potato partly to its being cultivated in too humid climates and partly to the tuber having been unduly stimulated at the expense of the other organs of the plant. There are many hundred species of *Solanum* known which do not produce any tubers, but maintain their ground in the world by their seeds alone; and he argues that, in order to extend the power of climatic adaptation of potato species, 2, 3 and 4 should be brought into cultivation, and tried both as pure specific types and as hybridised with the numerous forms of *S. tuberosum*.—Mr. M. C. Cooke made a communication, "On the Structure and Affinity of *Sphæria pocula* Schweinitz." Originally described by Schweinitz in the Academy of Natural Sciences, Philadelphia (1825), its position has hitherto been unquestioned. Dr. Cooke, however, has been enabled to make a microscopical examination, the result being that he shows that structurally it is hymenomycetal, and not ascomycetal, being allied to the genus *Polyporus* or *Porothelium*. He designates it *Polyporus* (*Mesopus*) *Pocula*, allied perhaps in habit to *P. pendulus*, but in substance to *P. rhipidium*.—A paper by Mr. W. Joshua was read, *viz.*, "Notes on some Burmese *Desmidieæ*," in which he figures and describes new and interesting species.—"Novitates Capenses" was the title of a paper by Mr. Harry Bolus, mainly confined to diagnoses of new or rare Cape Orchids, &c.

ON PROTOPLASMIC CONTINUITY IN THE *FLORIDEÆ*.

By Thomas Hick, B.A., B.Sc.

(Plates 243 & 244.)

(Concluded from p. 38).

Polysiphonia nigrescens agrees in the main, in structure and histology, with *P. fastigiata*. The central-siphon cells are more elongated and cylindrical, and the cortical siphons are fewer in number. As the cell-walls of the central siphon thicken, they do so uniformly, so that the protoplasmic body retains more or less of its cylindrical shape.

Protoplasmic continuity is well marked, and may be traced throughout the whole thallus. The cells of the different siphons have their contents connected by protoplasmic threads which pass through the end walls, and those of the central siphon are connected with those of the cortical siphons by lateral processes. These processes are situated about the middle of the cell and are comparatively short, owing to the small amount of thickening the walls undergo.

Polysiphonia atro-rubescens has such close resemblance to the preceding species that it will be no marvel that it agrees with it also in the matter of protoplasmic continuity. The cells of the central siphon are of a similar shape and have similar connections, both with one another and with the cells of the cortical siphons.

Polysiphonia byssoides, *P. tenella* and *P. formosa* present similar phenomena.

3. Ceramium.

The genus *Ceramium* has a structure differing from that of *Polysiphonia* in many respects, but agreeing with it in presenting a thallus consisting of a central axis or siphon of cells, clothed to a greater or less extent by a cortex. The latter, however, originates in a different manner, being composed of cells or branches which arise at the joints or nodes, and become adherent to the main filament. The cortex formed by these branches frequently becomes so thick that it is impossible to make out the organisation of the central siphon without the aid of transverse and longitudinal sections. Even on the smallest branchlets the nodal cortications are so dense and so peculiarly arranged, that the state of affairs at the joints of the central siphon is not obvious without the aid of reagents and some manipulation. By the help of these, however, it may be satisfactorily established that protoplasmic continuity exists here quite as regularly as in the genera previously considered.

Ceramium acanthonotum has the protoplasmic bodies of the central cells connected as shown in Plate 243, fig. 6. In the youngest branchlets the protoplasm of each cell appears in optical longitudinal section, as a lozenge-shaped mass enclosed in a more or less thickened wall. The cortex fills up the depressions between

the cells at the joints, and forms a series of cellular rings, each of which bears a short stout spine. The cortex does not present so obvious a case of continuity as does that of *Polysiphonia*, but its existence may be made out in carefully prepared specimens.

Ceramium rubrum has its central siphon-cells more cylindric or rounded in outline, and has a more complicated cortex, but does not differ materially in other structural details. The connections of the central cells are similar to those of *C. acanthonotum*, and those of the cortical cells are shown in Plate 243, fig. 7. In longitudinal sections of the oldest and stoutest parts, we have the most convincing evidence of the existence of continuity. Such a section is represented in Plate 244, fig. 8. From this it will be seen that the protoplasm of the central cells (*a*) shows no interruption at the ends of the cells, and is connected laterally with the cortical cells by protoplasmic threads. The connections of the cortical cells *inter se* are most remarkable, being effected not by single threads, but by several, which radiate from the central mass like the pseudopodia of a Rhizopod. Each thread carries a collar which resembles that met with in *Polysiphonia fastigiata*, and like it, appears, in some cases, to enclose a delicate diaphragm.

4. Ptilota.

The genus *Ptilota*, so much admired for the loveliness of its forms, is no less remarkable for the striking examples it offers of protoplasmic continuity. Of all the *Florideæ* examined few have presented the phenomena in a more complete and demonstrative manner than the Ptilotas, especially *P. elegans*. Fundamentally monosiphonous, like most of the plants previously considered, the older parts of this species become densely corticated. The central siphon, however, retains its individuality in spite of this, and can usually be seen through the cortical cells, even in the stouter parts of the stipes. The successive branches become less and less corticated, until in the ultimate divisions of the frond we have nothing but simple filaments composed of quadrate or oblong cells. The protoplasmic bodies of these cells are in uninterrupted continuity from one end to the other; the basal cell of each branchlet is also connected with a cell of the branch from which it springs. From these ultimate branchlets the continuity may be traced backwards without a break, to the main stem of the frond. The protoplasmic threads of the branchlets are extremely fine, are destitute of colouring-matter, and are destitute of the collar met with in the older parts. As we work backwards to these last, however, the threads become thicker and the collar makes its appearance.

On plate 244, figs. 9, 10, 11, a portion of the frond and sections of the stipes of *Ptilota elegans* are represented. From these some idea of the completeness of its continuity may be obtained. Fig. 9 shows the tip of one of the branches, while fig. 10 is an enlarged view of the protoplasmic bodies of the central cells of an older part, with their connections *inter se*, and with the lateral branchlets. At fig. 11 is a section of a still older part of the stipes, showing that

continuity does not disappear with age, but still obtains in the axial cells. It is equally persistent in the cortical cells, but the details of this are not shown in the drawing.

Ptilota plumosa differs from *P. elegans* chiefly in the degree of cortication which it presents, even the youngest branchlets being provided with cortical cells. As regards protoplasmic continuity, however, it agrees with the more elegant species, though this is a little more difficult to demonstrate.

5. Wormskioldia and Delesseria.

The genera *Wormskioldia* and *Delesseria*, which, though separated by modern algologists, may be here taken together, include several Algæ which are characterised by the beauty of their forms. The best known of these is perhaps *Wormskioldia sanguinea*, formerly called *Delesseria sanguinea*, whose leaf-like frond is of a fine rose-red colour and is differentiated into a sort of petiole and lamina, with a midrib and lateral veins. Throughout these various portions of the frond protoplasmic continuity is exhibited in a distinct and unmistakable fashion.

The stipes consists of cells of various sizes, somewhat irregularly disposed, but generally having their long diameters parallel to the axis of the frond—the larger cells being placed towards the centre and the smaller towards the periphery. The walls of the cells are much thickened and stratified, but not uniformly. For at various points the thickening is interrupted in such a way as to leave open channels of communication between cel land cell, along which run protoplasmic threads connecting the contents of contiguous cells. At the common boundary of the cells there is a distinct collar, such as has been already described. The connecting threads are given off very irregularly, so that the cell contents often present a stellate appearance, especially in transverse sections, and at the upper and lower ends of the cells two or three threads, each with its own collar, are often seen in close juxtaposition.

Similar phenomena are presented by the so-called midrib, the structure being essentially the same as that of the stipes.

Of the genus *Delesseria*, two or three of the commoner species, and several forms of *D. alata* have been examined, and all exhibit, without exception, phenomena of continuity in the main agreeing with those just described.

6. Chondrus, Gigartina, and Cystoclonium.

Only one species of *Chondrus* is common on British coasts, *Chondrus crispus*, the Irish or Carrageen Moss of commerce. The general appearance of the frond is so well known as to need no description. Its structure is almost entirely cellular, the cells being densest towards the surface of the frond, looser and slightly elongated in the direction of growth, towards the centre. The boundaries of the individual cells are lost in the general gelatinous framework, but the protoplasmic bodies are distinct, or may be made so by iodine solution, aniline blue, and other reagents. They are extremely small masses of protoplasm, and strongly resemble,

in shape and appearance, small multipolar nerve-cells. The diverging processes which give them this appearance run into those from other cells, so that a complete meshwork of protoplasmic threads and bodies is formed. The connecting threads are much finer than most of those previously described, but some of them carry a small bright particle which may be presumed to represent the collar met with in other genera.

Gigartina mamillosa, in its external characters, presents many points of resemblance to *Chondrus crispus*, and its histological structure is also more or less similar. The cells of the inner portions of the frond are however more regularly filamentous, and have fewer protoplasmic connections with other cells. Where they form filaments, the cells are connected longitudinally by single protoplasmic threads, similar to those of the less complex Callithamnions so that each cell has only two connections, except where, a branch is given off, in which case there are three.

Plate 244, figs. 12 and 13, are semi-diagrammatic views of the *Chondrus* and *Gigartina* respectively, which will illustrate these details.

Cystoclonium (*Hypnea*) *purpurescens*, whose elongated decompoundly branched thallus is not unfrequently met with on British coasts, exhibits continuity throughout, both in its filamentous and cellular elements, The protoplasmic connections of the former are noteworthy, as presenting appearances not unlike those of the smaller sieve tubes of the cucumber and vegetable marrow.

7. Plocamium.

The genus *Plocamium* is represented on British coasts by a single species only, viz., *P. coccineum*. This is a well-known "weed," and consists of a compressed membranaceous frond, whose ultimate branchlets are pinnate and alternately secund. Each portion of the frond is composed of an axial row of cells, which becomes densely corticated and only remains free, if anywhere, at the tips of the ultimate ramifications.

Sections made in different directions along the stouter portions of the frond reveal a very elaborate system of protoplasmic connections. The elongated cells of the axial row have their contents united by stout, single, protoplasmic connections, which pass through the end walls, where they are surrounded by a collar. Surrounding the axial cells is a layer of moderately large, polyhedral cells, whose walls, like those of the axis, are considerably thickened. The contents of these cells are connected with one another, as well as with the contents of the axial cells, the connection being effected by means of protoplasmic threads, which run down pits in the thickening layers and pass right through into the adjoining cell. At the point where the thread passes from one cell to the other—*i. e. between* the two cells—there is a lenticular body which has a much larger diameter than the thread itself. This stains with iodine and aniline blue like the protoplasm, and in the older parts may differentiate a delicate membrane similar to that described in *Polysiphonia fastigiata*.

When the protoplasm escapes from the cells it may or may not carry with it the lenticular body. In the former case there is an open communication between cell and cell, which is very obvious when the cell wall is stained.

The cortical cells are much smaller than those already described, but their walls attain some thickness, and their contents are connected throughout, in a similar manner to that now under notice.

8. Laurencia.

As regards protoplasmic continuity, *Laurencia* is one of the most interesting genera yet dealt with. One of the commoner species, *L. pinnatifida*, is well known to the algologist by its somewhat triangular or lanceolate pinnatifid frond and its extreme variability under different conditions. Sections of the frond of this species show the centre to be composed of comparatively large cells, which are elongated longitudinally, and are circular in the transverse section, while the cortex is composed of cells that are shorter and more densely packed, but otherwise of a similar character. Owing to the great degree of thickening which the walls undergo, the protoplasmic contents of the cells often become reduced to a mere band or thread, and then in transverse section they appear as a small particle in the centre of the cell lumen. From the protoplasmic body of each cell several processes are given off, which run along channels or pits in the thickened wall, and give the contents the appearance of a Rhizopod. On reaching the boundary of the cell each thread expands into a small circular protoplasmic disk, which fits like a plug into an aperture in the partition wall. On the other side of the disk the protoplasm again contracts into a thread, which is continued forwards until it merges into the main contents of the cell. The margin of the aperture undergoes a lip-like thickening as in *Polysiphonia* and other genera, and in the oldest cells a delicate membrane appears to be differentiated within the protoplasmic disk. *Vide* Plate 244, fig. 14.

9. Petrocelis.

Petrocelis cruenta I. Ag. (*Cruoria pellita* Harv.) forms horizontal gelatino-coriaceous fronds, which expand indefinitely in outline, and grow attached to rocks between high and low water-mark. When detached and cut vertically the structure is seen to consist of erect cellular filaments, embedded in a gelatinous matrix, in which the walls of the individual cells are lost. As in the simpler Callithamnions, the contents of each cell are united to those of the cells above and below by an extremely fine protoplasmic thread. As the cells at the base of filaments are also connected in a similar manner, the continuity is as complete here as in other forms. *Vide* Plate 244, fig. 15.

10. Freshwater Florideæ.

Of freshwater *Florideæ* the only genera examined, and that somewhat cursorily, are *Batrachospermum* and *Chantransia*. The

material was old and not very demonstrative, but it afforded some indications of continuity, though in a form less definite and complete than that of the marine genera.

General Conclusions.

From what has been advanced in the preceding paragraphs, it seems clear that if not universal, protoplasmic continuity is very widely distributed in the *Florideæ*. That it should differ somewhat in different genera and species is only what might have been suspected *à priori*, and the marvel is that the differences are not much greater than they are.

As to the question of origin, it would seem that in all these plants the protoplasmic threads originate, as a rule, in the manner described by Professor E. P. Wright for *Polysiphonia urceolata*.* As a matter of fact, the process of cell division appears never to proceed so far as to completely separate the different portions of a divided protoplasmic body, so that they remain connected together by one or more threads of protoplasmic material.

That these threads are not merely temporary or accidental, but permanent and essential structures, is proved by the fact that they are normally present in all parts of the thallus, from the oldest to the youngest, and are not restricted to special localities and special cells.

That they are not dead, but possess the vitality and powers of ordinary protoplasm, seems equally certain. In the first instance they are extremely fine, and are often colourless and non-granular, as if formed of the hyaline matrix met with in protoplasmic structures. As they become older, however, they increase in thickness and become granular, and in some cases, though apparently not in all, assume the colour of the protoplasm of the cell. They evidently possess therefore the power of growth. But besides this, they are capable of giving rise to differentiated structures. It has been pointed out that in a great many cases a sort of ring or collar makes its appearance on each thread, at about its middle point. This, as previously stated, is a sort of lip-like thickening of the margin of the aperture through which the thread passes, due doubtless to the action of the thread itself. Again, in *some* species, a delicate diaphragm is developed within the collar. The nature and functions of this it is somewhat difficult to determine, but that it is not an ordinary cellulose partition is indicated in several ways. In the first place it is absent from the youngest and finest threads, and only becomes distinctly differentiated as they grow older and stouter. With iodine and analine dyes it reacts like the protoplasm rather than the cell walls, and grows in diameter, with the collar, as the connecting thread increases in thickness. When the protoplasm is made to contract and retires from the ordinary wall, it does not, as a rule, separate

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* 'Transactions of the Royal Irish Academy,' 1879. 'On the Formation of the so-called "Siphons," and on the Development of the Tetraspores in Polysiphonia.'

from the diaphragm, and if the thread be ruptured by mechanica or other means, the rupture is not more frequent at the diaphragm than elsewhere. Looking at all the facts of the case, and remembering that the origin of the diaphragm, where it occurs, is later in time than that of the protoplasmic connections, there can be little doubt that it is a structure special to those connections, and that, whatever be its ultimate function, it offers no interruption to protoplasmic continuity, so long as the cells on both sides of it are vitally active.

In conclusion, I have pleasure in acknowledging my obligations to Professor E. P. Wright, M.D., of Dublin, for much kindly encouragement and severable valuable hints, and to my friend Mr. G. Massee, of Scarborough, for his able assistance in determining doubtful species and for many valuable suggestions.

Explanation of Plates.

Plate 242.—Fig. 1. Portion of axis of *Callithamnion roseum*, with cells of primary and secondary branches; the contents of the cells connected throughout. Fig. 2. Portion of ultimate branchlet, with developing tetraspores. Protoplasmic masses connected by extremely fine filaments, on which the collar has not yet appeared. Fig. 3. Longitudinal section of main axis of *Callithamnion arbuscula*. At *a* are represented the central and at *b* the cortical cells. The boundaries of the walls of the cortical cells are lost in a uniform gelatinous matrix, and the protoplasm of the central cells has shrunk from the lateral walls. Fig. 4. Portion of filament of *Polysiphonia urceolata*, showing the protoplasmic connections of the axial and the cortical cells. Fig. 5. Longitudinal section of axis of *Polysiphonia fastigiata*, showing the protoplasmic connections of the axial and the cortical cells. Fig. 6. Protoplasmic bodies from the axial cells of *Ceramium acanthonotum*. Fig. 7. Protoplasmic bodies from the cortical cells of *Ceramium rubrum*.

Plate 243.—Fig. 8. Semi-diagrammatic longitudinal section of an old and stout portion of *Ceramium rubrum*. At *a* are the axial cells, and at *b* the cortical ones. Fig. 9. Tip of branchlet of *Ptilota elegans*, showing continuity throughout. Fig. 10. Protoplasmic bodies from axial cells of *Ptilota elegans*, showing their connections with those of the lateral branches. Fig. 11. Longitudinal section of old and stout portion of axis of *Ptilota elegans*, showing the connections of the central cells. Those of the cortical cells are not indicated. Fig. 12. Section of thallus of *Chondrus crispus*. Fig. 13. Section of thallus of *Gigartina mamillosa*. Fig. 14. Cells from inner portion of the thallus of *Laurencia pinnatifida*. Fig. 15. Section of thallus of *Petrocelis cruenta*.

ON THE UPLAND BOTANY OF DERBYSHIRE.

By W. West.

All field-botanists will hail with delight the excellent practical paper of Mr. Baker on this subject. I was particularly pleased, as I rambled over some of these uplands some time ago, but did not at that time carry an aneroid with me, and I have in vain tried to obtain some of the elevations mentioned from ordnance maps. The following additional facts may be interesting, as a small supplement to Mr. Baker's able paper.

Thalictrum montanum. Millers Dale, 350 yds.; Cave Dale, 350 yds.—*T. flavum*. Monks Dale, 350 yds.

Trollius europæus. Monks Dale, 350 yds.

Cardamine impatiens. Chee Dale, 300 yds. I have also seen specimens from a lower elevation at Cromford.

Nasturtium officinale. Wormhill, 400 yds.

Draba muralis. Chee Dale, 300 yds.—*D. incana.* Monks Dale, 350 yds.

Hutchinsia petræa. Chee Dale, 300 yds.

Viola lutea. Mam Tor, abundant, 450–550 yds. Old Moor (between Peak Forest and Castleton), 500 yds. N. of Hassop, 300 yds.

Silene inflata, var. *puberula.* "Very characteristic" at Matlock at about 200 yds. (as near as I can tell); other plants near were *Alsine verna, Thlaspi virens, Genista tinctoria, Serratula tinctoria, Rhamnus catharticus, Cornus sanguinea, Malva moschata,* and a depauperate form of *Campanula latifolia.*—*S. nutans.* Head of Monks Dale, 350 yds. Wormhill, 350 yds., reaching the upper limit of the mid-agrarian zone.

Alsine verna. Old Moor, 450 yds.

Hypericum montanum. Monks Dale, 350 yds.

Geranium pratense and *G. lucidum.* Wormhill, 350–400 yds.

Rhamnus catharticus occurs at 350 yds. between Millers Dale Station and Wormhill in several places, and thus reaches the upper boundary of the mid-agrarian zone. (It occurs in Yorkshire at the same altitude and on the same formation, between Melham Cove and Tarn.)

Ulex europæus. Wormhill, 350–400 yds.

Trifolium striatum. Millers Dale Station to Wormhill, 350 yds.

Vicia hirsuta. Millers Dale, 300 yds.

Prunus Padus. Monks Dale, 350 yds.

Spiræa Ulmaria. Monks Dale, 350 yds.

Agrimonia Eupatoria. Monks Dale, 350 yds.

Sanguisorba officinalis. 350 yds. (not as a weed, but associated with *Carduus heteropyllus, Trollius, Pimpinella magna,* &c.), Monks Dale.

Potentilla verna. Monks Dale, 350 yds.

Rubus cæsius. Chee Tor to Wormhill, 350 yds.—*R. Chamæmorus.* I have seen it on Axe Edge, but it is much more abundant on the western side of the plateau of "The Peak" at 600 yds.

Rosa mollissima. Millers Dale Station to Wormhill, 350–400 yds.

Geum intermedium. Millers Dale, 300 yds.

Pyrus rupicola. Wormhill, 350–400 yds. Chee Dale 300 yds. —*P. malus.* Wormhill, 400 yds.

Circæa Lutetiana. N. of Hassop, 250–300 yds.

Ribes Grossularia occurs in isolated bushes on limestone in many places up to 400 yds., just as it does on the same formation in Yorkshire up to 300 yds. I venture no opinion as to its nativeness; it occurs far away from lanes and houses.—*R. rubrum.* Chee Tor to Wormhill, 350 yds. It seems native, but it is not *R. petræum*, which I am familiar with on Yorkshire limestone.—*R. alpinum.* Millers Dale, 300 yds. This also occurs at 400 yds. near Wormhill.

Sedum Telephium. Monks Dale, 350 yds. Also at a lower elevation at Cromford.

Saxifraga tridactylites. Wormhill, 400 yds. — *S. hypnoides.* Cave Dale, 400 yds.—*S. granulata.* S.W. of Buxton, 400 yds. Wormhill, 400 yds.

Pimpinella magna. Monks Dale, 350 yds.

Bunium flexuosum. Wormhill, 400 yds.

Viburnum Opulus. Monks Dale, 350 yds.

Galium verum. Wormhill, 400 yds.—*G. sylvestre.* Wormhill and Castleton at 400 yds., but not so fine as in Chee Dale at 300 yds.

Valerianella Olitoria. Wormhill, 400 yds.

Carduus nutans. Wormhill, 400 yds. — *C. heterophylla.* Very fine at 350 yds. in Monks Dale.

Carlina vulgaris. Wormhill, 350 yds.

Serretula tinctoria. Monks Dale, 350 yds.

Campanula Trachelium. Monks Dale, 350 yds.

Vaccinium Oxycoccos. Coombes Moss, 500 yds.

Ligustrum vulgare. Native in Monks Dale at 350 yds.

Polemonium cæruleum. Flag Dale and Chee Dale at 300 yds.

Scrophularia Balbisii. Bakewell, under 200 yds.

Calamintha Acinos. Flag Dale, 300 yds.

Myosotis sylvatica. Flag Dale, 300 yds.

Symphytum officinale. Bakewell and Matlock, under 200 yds.

Pinguicula vulgaris. Monks Dale, 350 yds.

Primula veris. Monks Dale, 350 yds. Wormhill, 400 yds.

P. vulgaris. Flag Dale, 350 yds.

Plantago media. Wormhill, 400 yds.

Chenopodium Bonus-Henricus. Near houses at Wormhill, 400 yds.

Arum maculatum. Millers Dale to Wormhill, 350 yds.

Orchis mascula. Wormhill, 350–400 yds.

Gymnadenia conopsea. Monks Dale, 350 yds.

Listera ovata. Chee Dale, 300 yds.

Carex ornithopoda. Slopes of High Fell, 350 yds.—*C. præcox.* Wormhill, 350 yds.—*C. vesicaria* and *C. hirta* occur very sparingly in Millers Dale at 300 yds. — *C. glauca*, var. *stictocarpa.* Slopes of High Fell, 350 yds. — *C. binervis.* Axe Edge and near Castleton, 400–500 yds. — *C. riparia.* Near Bakewell, under 200 yds.

Aira caryophyllea. Millers Dale to Wormhill, 350 yds. — *A. pubescens.* Chee Dale, 300 yds. — *A. pratensis.* Limestone slopes of High Fell, 350 yds. A starved form, the same which occurs on the limestone scars of Yorkshire from 300 to 400 yds. I judge it to be an approach to *alpina.*

Koeleria cristata. Millers Dale, 300 yds.

Melica nutans. Monks Dale, 350 yds.

Poa nemoralis. Monks Dale, 350 yds.

Asplenium viride. Castleton to Old Moor, rare, 400 yds. — *A. Ruta-muraria* and *A. Trichomanes.* Wormhill, 400 yds.

Cystopteris fragilis. Wormhill, 400 yds.

Nephrodium aculeatum, var. *lobatum.* Chee Dale, 300 yds.; Monks Dale, 350 yds.

Polypodium vulgare. Wormhill, 400 yds. — *P. Robertianum* is common in the unfrequented limestone dales, 300–350 yds.

Botychium Lunaria. Monks Dale, 350 yds.

Claytonia alsinoides is well established in a wood N. of Bakewell, far from houses; *Ribes nigrum* and *Mimulus luteus* also occur as escapes, about the river in Chee Dale. I regret having only added one record from "The Peak;" but the only day I was on it, it never ceased raining, and I was enveloped in such dense mists that my utmost vision had to be utilised to save me from danger, the compass and ordnance map having also to be frequently used.

LIFE-HISTORY OF *LITHOSPERMUM PURPUREO-CŒRULEUM* Linn.

By James W. White.*

There are several points connected with the life-history of this most beautiful and interesting plant which hitherto have not been appreciated by botanical writers. This neglect is probably due to the rare and local occurrence of the species, whose habitats lie for the most part in the extreme west of this country, and are scattered over hilly and thinly populated districts, not readily accessible, and but seldom visited. It is not surprising therefore that the writings of descriptive botanists plainly show that in some cases dried specimens, collected only at the time of flowering, have been the material from which the published characters have been derived. In other instances authors have not seen the fruit, and in others again, most certainly they cannot have seen the root. Thus we find that not merely are the descriptions in some respects erroneous, but also that the chief feature in the development and propagation of the plant has been overlooked. From the earliest times this species has been named "the Creeping Gromwell"; but although one or two old authors appear to have been correctly informed, none of the manuals in present use describe the manner in which it creeps, or rather *strides*, over the ground by means of the peculiar arching elongation of the barren shoots, which ultimately produce new individuals by rooting at their tips.

In the 'Manual of British Botany' it is said of this species, "barren stems prostrate, creeping, ... nuts 'silvery white, highly polished, slightly rugged,' rarely produced." It is fair to infer from this description, that Prof. Babington had not viewed the living plant, nor yet seen a specimen in fruit.

In the 3rd edition of 'English Botany' we find, "barren stems elongate, arching, procumbent. . . . . Rootstock slender, woody, shortly creeping, producing arching barren shoots about 1 foot long." This gives the impression that the plant creeps by its roots, and not a word is said in relation to the chief method

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[* Mr. White has kindly forwarded a beautiful series of specimens in illustration of this paper to the British Museum Herbarium.—Ed. Journ. Bot.]

of propagation; although in the first edition of the work Sir J. E. Smith remarks that most of the leafy stems throw out roots, and on that point is more correct than his successor. The poor, badly-coloured figure (E. B. 117) is supplemented in the 3rd edition by a barren horizontal shoot, which however does not bear rootlets.

In the 'Student's Flora' the description runs "barren stems creeping, ... rootstock creeping," without note on the manner in which the "creeping" is effected.

These quotations show that this Gromwell is believed to have either a creeping root, or prostrate creeping barren stems; and to produce fruit but rarely. I wish, by giving the result of my observations on its growth in Somerset, to supply the deficiencies to which I have drawn attention; and to record the facts that the roots do not creep; that fruits are ripened on every cyme, if not in every calyx; and that the barren shoots, which seldom spring from a flowering root, are primarily erect, then high arching, and ultimately root at the tip, often at a considerable distance from the parent; the young plants quickly becoming separated by the decay of the connecting links.

Lithospermum purpureo-cœruleum is at home in the warm borders of rocky woods in Somerset. Old woods and coppices of oak, beech, whitebeam and hazel are frequent on the Mendips, nestling in hollows at the base of the hills or clothing the flank of some outlying spur. Sheltering amid the coarse herbage and tangling briars on the sunny fringes of these woods, seldom penetrating very far into the shade, nor yet venturing more than a yard or two into the open ground, the handsome deep blue flowers of our plant can be seen abundantly in many places at the beginning of May. The soil is merely fragments of limestone, leavened with a little loam, from which the roots can readily be disengaged. The root-stock is small, woody, gnarled and twisted, with comparatively large fibres or branchlets. Its position is more or less horizontal; and producing shoots only at the apex, it lengthens annually to the extent of the width of the terminal buds.

At the early season when the flowers first open, the stems, barren or flowering, rarely exceed a foot in height. They are alike erect, and the inflorescence is compact and half-shrouded amid the agglomerated bracts and terminal leaves of the shoot. The cyme quickly elongates and discovers two or sometimes three forks, which continue to lengthen during the summer until the fruit is ripe in October, when the total height of the stem may be two feet on an average, of which the fruit cyme will occupy a third. The calyx segments also grow to about double their original length. Only half of the twelve to eighteen flowers upon each cyme produce fruit, one or at most two polished porcelain-like nuts being found in each fruiting calyx. These nuts are very persistent and conspicuous on the brown, withered, but erect stems, which when seen the next spring suggest the idea of deserted telegraph poles with unusually large insulators; but on being handled in preparation for the herbarium they detach easily and can hardly be preserved *in situ*.

Meanwhile the barren stems, which are not usually produced from a flowering root (I find that the root appears to produce alternately barren stems and fertile ones,—seldom both in the same season) have also developed, and from their first erect position have loftily arched until, in the autumn, their tips reach the ground. The terminal portions have already put forth some short, stout rootlets, and when these touch the earth they soon take hold, and new plants result. At spots where the *Lithospermum* is abundant, the ground in October is thickly set with green hoops, about the size and shape of those used in croquet; although in shade a barren stem will occasionally form an arc with a chord of three feet. As soon as the rooting tip has established itself the rest of the shoot becomes brittle and decays, its vitality having been expended in the formation of the young plant.

A NEW CHINESE MAPLE.

By H. F. Hance, Ph.D., F.L.S., &c.

In view of the very considerable number of North Chinese, Manchurian and Japanese plants which are now known to extend to southern China, it is somewhat remarkable that the explorations of the last few years, in the province of Kwang-tung, had not brought to light a single new *Acer*, though the focus of this genus is Japan, whence no less than twenty species are recorded. The Rev. Ernst Faber has just brought me an undescribed Maple, of which I subjoin a diagnosis, but this belongs to a small group found only in the Himalayas, the mountains of Bengal, the Malay archipelago, and south China, though one of them is also met with in the Lu-tchiu islands. It would seem, therefore, that the North-Asiatic species do not extend far south; and that we must not expect to find here very closely allied forms.

Acer Fabri, sp. nov.—Ramulis angulatis glaberrimis, foliis tenuiter coriaceis lanceolatis integerrimis basi rotundatis apice caudato-acuminatis penninerviis opacis utrinque subdistincte reticulatis 2–2½ poll. longis 9–11 lin. latis petiolo filiformi 3-lineali, floribus . . . ?, samaris paucis fusco-brunneis in cymas terminales laxas dispositas 15 lin. longis divergentibus alis venosis dorso rectis ex apice obtuso intus sensim curvatis loculum ovoideum valde connexum nervatum triplo superantibus.

In jugo Lo-fau-shan, prov. Cantonensis, m. Sept. 1883, detexit rev. E. Faber. (Herb. propr. n. 22220.)

Intermediate between *A. reticulatum*, Champ. ! and *A. lævigatum*, Wall. ! but with the leaves much less closely netted than in either. In foliage it agrees most with the latter, in fruit with the former, except that the dorsal edge of the wing is contiguous to the fruit-cell, and not separated by a distinct intermediate membrane.

A NEW FLORA OF SURREY.

By W. H. Beeby.

The period—over twenty years—that has elapsed since the publication of Brewer's 'Flora of Surrey,' and the advance that has been made since 1863 in the study of botany, both as regards plant distribution and the better understanding and separation of allied forms, have created a desire for a new flora of the county, approximating more closely to our present knowledge, besides including old records which are not to be found in the work above alluded to, and giving an accurate account of the distribution of the common plants; due attention being also paid to the history of the progress of botanical investigation in the county. The first distinct effort in this direction was made by Mr. Arthur Bennett, who some years since published a list of plants absent from Surrey, but found in one or more of the adjacent counties; at the same time inviting information. Since then Mr. Bennett has found himself unable, from want of time, to continue the work which, at his request, I have undertaken.

It was at first proposed to adhere to the divisions devised by Salmon and used by Brewer, which, as more or less artificial districts, are good ones. Various considerations, however, seemed to point to the river-basin system as the most natural, and at the same time, most scientific basis for a division of the county, and it has accordingly been adopted. A strong desire was felt to avoid, if possible, a division of the chalk range from east to west, and to draw the line separating the upper and lower districts at the foot of the chalk escarpment instead of along its crest; but to do this would unfortunately have interfered with the main principle on which the districts are planned, by cutting off from the Eden district a portion of its natural drainage basin; and for this and other reasons it has been found necessary to draw the line as described. The districts are named after the rivers draining their respective areas; the basins of the River Wey and River Mole, which include some two-thirds of the whole county, have each been divided into upper and lower districts; the Upper and Lower Wey, the North-east streams, and Arun districts, have further been divided into subdistricts. This subdivision was imperative in the latter case, the two Arun subdistricts being naturally separated by the overlapping of the River Wey.

I am greatly indebted to Mr. Boulger for his most valuable assistance in devising and working out the different districts, which, in this county, present unusual difficulties.

In the following brief description the main object has been to give such information as will enable anyone to trace on a good map the various districts and subdistricts, which are as follows:—

Thames.—1. Blackwater. 2. Upper Wey; *a*. west, *b*. east. 3. Lower Wey; *a*. north-west, *b*. south-east. 4. Upper Mole. 5. Lower Mole. 6. North-east Streams; *a*. Hogg's Mill Stream and Beverley Brook, *b*. Wandle and Metropolitan Streams. 7. Eden.

Channel.—8. Arun; *a*. Ockley, *b*. Chiddingfold.

1. Blackwater is bounded S. by a line starting from the Hants border at Lower Old Park, passing N.E. through Upper Old Park and Upper Hale, thence S.E. through Hale and Badshot, crossing the railway and following the Guildford road to a point on the Hog's Back a little N.E. of Seale; thence the E. boundary runs N. to Ash Green station, then by the workhouse, Fox Hills, Chobham Ridges and through Paschal Wood to the borders of Berks. The further boundaries are formed by the adjoining counties of Hants and Berks.

2. Upper Wey is bounded N. by District 1 to the point N.E. of Seale, thence by the road along the Hog's Back to Guildford, where the line passes through the town and is continued along the crest of the chalk escarpment past Albury Downs, Netley Heath and Hawkhurst Downs to White Downs; thence the E. boundary runs S. through Wootton, by Broadmoor, to its junction with the boundary of District 8 *a*, at Coldharbour. The rest of the E. as well as the S. boundaries are formed by District 8 (*a* and *b*), and by the county of Sussex. The county of Hants forms the W. boundary. The two subdistricts, *a* (west) and *b* (east), are separated by the water-parting of the two main branches of the River Wey; the dividing line leaves District 8 *b* near Hambledon, and passes by Munstead Heath to the juuction of the two streams, and thence by the River Wey itself to Guildford. The west subdistrict lies almost exclusively on the lower greens and formation, and abounds in extensive heaths and commons, with considerable elevations, as at Hind Head. It is here, and in Districts 1 and 86, that several species which occur in the adjoining parts of Hants should be sought; the Bramshot station for *Lycopodium complanatum* is but a few yards from the county border, while there is reason to hope that *Eriophorum gracile*, now extinct at Whitemoor Pond, may be found elsewhere in this region. *Pinguicula lusitanica* and *Utricularia intermedia* also may possibly occur.

3. Lower Wey is bounded W. and N. by District 1, the county border and River Thames; E. by a line running N. from Hawkhurst Down to Effingham Common, thence by Ockham and Cobham Commons, St. George's Hill and Oatlands Park to the River Thames; S. by District 2. Two subdistricts are separated—*a* (north-west) and *b* (south-east). The former contains chiefly the basin of the Bourne Brook, and is marked by a line starting from the Blackwater boundary on Hag Thorne Moor, thence passing through Bisley to the Basingstoke Canal at Woking, and following the northern bank of the canal to Ham Haw, and thence N.E. till it meets the River Thames midway between the River Wey and Bourne Brook. Subdistrict *a* is all but untrodden ground, and offers a wide field for investigation. The River Thames itself deserves further attention, and *Potamogeton prælongus*, which requires confirmation for the county, will probably be found there.

4. Upper Mole is bounded N. by the continuation of the line along the chalk crest from White Downs by Ranmer Common, Box Hill, Pebble Hill, Reigate Hill and Gatton to the Merstham tunnel,

and thence by Tolhurst and Willey farms to White Hill; E. by a line running S. from White Hill through Bletchingley, thence E. by Coldharbour, and again S., passing a little W. of Horne and across Copthorne Common to the Sussex border; S. by the county of Sussex, and W. by Districts 2 and 8 *a*.

5. Lower Mole is bounded N. by the River Thames; S. by District 4; W. by District 3; and E. by a line starting from the point where Districts 4, 5 and 6 meet on Merstham tunnel, thence N.W. through Chipstead, W. to the Reigate and Banstead road, which is followed N. to Tadworth, then past Epsom Downs and Epsom Common to Esher Common, thence following the railway northward to Claygate, and through Long Ditton to the River Thames.

6. North-east Streams is bounded N. by the River Thames; W. and S. by Districts 4, 5 and 7; and E. by the county of Kent. The two subdistricts are *a* (Hogg's Mill Stream and Beverley Brook), and *b* (Wandle and Metropolitan streams). The water-parting dividing them runs N.E. from a point a little E. of Burgh-heath to Banstead, and thence through Sutton, Morden and Wimbledon to the River Thames. *Medicago minima*, which has not been found in the county for some years, should again be looked for at Epsom Downs and in the vicinity. It is desirable that any plants which may be peculiar to either of the river-basins in Subdistrict *a* should be noted, as it may be found advisable to keep the two basins distinct.

7. Eden is bounded N. by District 6; S. by the county of Sussex; E. by that of Kent; and W. by District 4. This district has produced several species new to the county, including *Potamogeton Zizii* and *Viola lactea*, and is rich in ferns, carices and aquatics.

8. Arun is bounded S. by the county of Sussex. The line enclosing Subdistrict *a* (Ockley) runs N.W. from Cowick, on the Sussex border, passing a little E. of the railway which is crossed N. of Ockley station, and thence to Coldharbour; then W. past Leith Hill tower to Holmbury Hill, and S. past Coophurst Farm to the county border. The boundary of Subdistrict *b* (Chiddingfold) passes from the Sussex border N. to Alfold Crossways; N.W. by High Loxley to a point S. of Hascombe, thence by Hambledon, Brook Street and Emily Farm to Gibbet Hill, thence S.E. by Haslemere and over Lythe Hill to Sussex. Dr. Trimen's prediction that *Dentaria bulbifera* would be found in this part of the county has been confirmed by Mr. E. Straker, who, in 1882, found that plant abundant on the Surrey side of the county boundary in Subdistrict *a*. This is indeed the only station for it in the county, for the single locality quoted by Brewer appears to belong to *Lathræa Squamaria*.

I have alluded to one or two of the rarer species to be found in Surrey, and any further information respecting such will be gladly received; at the same time, information as to the occurrence in, or absence from, any of the districts or subdistricts, of the usually common plants is particularly invited. Confirmation of the occurrence of the following plants is particularly required:—

Erodium moschatum.	Potamogeton prælongus.
Trifolium ochroleucum.	P. zosterifolius.
Vicia lathyroides.	Orchis hircina.
Callitriche vernalis.	O. purpurea.
Parnassia palustris.	O. Simia.
Galium anglicum.	Ophrys arachnites.
Carduus eriophorus.	O. aranifera.
Erica ciliaris.	Scirpus pauciflorus.
Mentha gentilis.	Carex strigosa.
Rumex maximus.	Calamagrostis lanceolata.
Salix ambigua.	Briza minor (as a wild plant).

An outline map, showing the districts and subdistricts, is in preparation, and I shall be happy to send a copy of the same, together with any further information that may be desired, on application to me at my address, 14, Ridinghouse Street, London, W.

ON SOME CHINESE SPECIES OF OAKS.

By Francis Blackwell Forbes, F.L.S.

During the work, in which I have been for some time engaged, of making a list of the Chinese plants in the herbaria of the British Museum and Kew, and of enumerating other published names and localities, I have had occasion to study certain Chinese oaks which are imperfectly known. The results of my examination are embodied in the following notes, which also refer to a few other species of the genus.

In 1818 Dr. Clarke Abel published a very interesting account* of the journey of Lord Amherst's embassy through the interior of China, from Peking to Canton. Dr. Abel was attached to the embassy as surgeon and naturalist, and his book contains many valuable details of his observations during the journey. His own natural history collections were unfortunately lost in the wreck of the frigate 'Alceste,' on her way home.† But as regards botany,

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* 'Narrative of a Journey in the Interior of China, and a Voyage to and from that Country in 1816 and 1817, by Clarke Abel, F.L.S.' London: 1818.

† "The cabins, in which but two days before we had reposed in comfort and security, were either empty or filled with motley lumber. One alone was an exception to this state. A collection of plants, seeds, and minerals, which had been made in China, was still in a great measure uninjured, but only mocked the vexation of the owner, who saw no chance of preserving it. Every one at the time being necessarily too intent on securing the means of general subsistence to attend to an individual's interest, it could only be recommended to the attention of the officer commanding on board, and by his directions was afterwards placed on a raft, which with everything upon it was burnt by the Malays."—Abel's Narrative, p. 256. In his preface Abel speaks with some bitterness of his losses, and adds that after leaving the wreck he had the mortification of hearing that the cases had been emptied of the seed collections by one of the seamen, to make room for some of the linen of one of the gentlemen of the embassy.

this loss was to some extent repaired by the preservation of specimens gathered by Sir George Staunton, one of the Commissioners in Lord Amherst's suite.

Descriptions of a few species of plants are given in Appendix A by Abel himself, and in Appendix B by Robert Brown. In the latter the new genera *Abelia* and *Loropetalum* are founded, and as this paper was reprinted with Brown's works,* the species are all well known to botanists. On the other hand, Appendix A has fallen into utter oblivion. Among the four new species † described there by Abel are two oaks *Quercus densifolia* and *Q. chinensis* (p. 363), both of which have escaped the notice, not only of the author of the monograph in the 'Prodromus,' and of Oersted, but of every writer on eastern Asiatic botany known to me. The only mention I have found of them is in the chapter on natural history of Dr. S. Wells Williams's classical work on China.‡ After searching in vain for the types of these species at the British Museum, where most of Staunton's plants are preserved, and in the Kew Herbarium, I acted on a suggestion that some of Staunton's specimens had found their way into the Lambert Herbarium at Oxford; but Mr. Druce, who kindly went through the oaks there, was equally unsuccessful. They are evidently absent from the Decandolle and Delessert herbaria, or they would have been taken up in the 'Prodromus.' According to M. A. DeCandolle (Phytographie, pp. 452 and 458), Staunton's collections were partly in the Webb Herbarium, which was bequeathed to the Grand Duke of Tuscany, and is now at the Florence Botanical Museum. There is therefore the chance that Abel's types may ultimately be found there; but in the meantime it seems worth while to bring the species to the notice of botanists, practically for the first time, by reprinting Abel's original descriptions—

* R. Brown, Misc. Works, ii. 321—328.

† The other two species are, (1), *Camellia oleifera*, the type of which, in the British Museum, was referred by Seemann (Linn. Trans. xxii. 344) to *C. Sasanqua* Thbg., and (2), *Eugenia microphylla*, a note on which I shall shortly publish.

‡ 'The Middle Kingdom.' London: 1883. Vol. i. 363. Since the above lines were penned telegraphic news has been received from New Haven, Connecticut, that my venerable friend Dr. Williams died there on the 16th of February. Dr. Williams went to China about half a century ago in connection with an American Missionary Society, and for some twenty-five years he acted as Secretary and Interpreter to the United States Legation, which he in fact directed during long and frequent intervals as Chargé d'Affaires. He was second to none in profound Chinese scholarship, an enduring monument of which has been left in his great Chinese Dictionary and in his work on the 'Middle Kingdom.' He was also much interested in Natural History. During the first American Expedition to Japan he made, with Mr. Morrow, important collections of plants, and he botanised in China from time to time as occasion offered. His name was given to several species by his friends Prof. Asa Gray and Dr. Hance, and in closing this slight tribute to the memory of a rare personality I may quote the concluding sentence of Prof. Asa Gray's description of his *Clematis Williamsii* (Mem. Amer. Acad. of Arts and Sciences, 1859, p. 306):—"The species is named for one of the collectors, S. Wells Williams, Esq., of Canton, a cherished friend and correspondent, author of one of the best works that have appeared upon the Chinese Empire, and a good naturalist, as well as a learned oriental scholar."

"*Quercus densifolia* (l. c. p. 363).—Q. foliis ovato-oblongis apice attenuatis subtus albicantibus, ramulis pubescentibus, spicis terminalibus erectis. Habitat prope lacum Poyang, prov. Kiangsi. Arbor mediocris. Rami dense conferti. Ramuli juniores præsertim tomentoso-sericei. Folia sub-biuncialia, perennantia, coriacea, rigida, supra glabra, nitida vix venosa, infra squamulis minutissimis albicantia, venosa, venis prominentibus. Petioli semi-unciam longi, pubescentes."

"*Quercus chinensis* (l. c. p. 363)—Q. foliis lanceolatis acuminatis basi in petiolos attenuatis, spicis fructiferis deflexis. Habitat prope lacum Poyang, prov. Kiangsi. Arbor excelsa. Ramuli substriati dichotomi. Folia alterna petiolata, 5 ad 6 uncialia, extra medium dentato-serrata, coriacea, supra glabra, infra squamulis minutissimis albicantia, nervo venisque primariis parallelis prominentibus. Spicæ solitariæ. Calyces fructus extus tecti squamis oblongis, valde sericeis, apicibus cuspidatis glabris; intus sericei."

On pages 164 and 165 of his 'Narrative,' Abel speaks of oaks found near Tatung, which is in An-whei province, but whether there is a confusion of localities, or whether, as is probable, the species were found in both places is of no practical importance. "One of the largest and most interesting of these trees," he says, "which I have called *Q. densiflora*, was an evergreen closely allied to *Q. glabra* of Thunberg, and resembled a laurel in the shining green of its foliage. It bore its branches and leaves in a thick head, crowning a naked and straight stem. Its fruits grew in long upright spikes, terminating the branches. Another species, *Q. chinensis*, growing to the height of fifty feet, bore them in long pendulous spikes."

M. Maximowicz, to whom I wrote on the subject, answers that he has no idea of what *Q. densifolia* may be, remarking, however, that it would suggest *Q. thalassica* Hance, were it not for the very small leaves described by Abel. The typical leaves of Dr. Hance's species are 3–5 inches long, but there are Chusan specimens in the Sloane Herbarium, labelled *Q. inversa* Lindl. (reduced by DeCandolle to *Q. thalassica*), the leaves of which average about two inches in length, and which in other respects might answer to Abel's description.

With regard to Abel's *Q. chinensis*, the case is somewhat simplified by his fuller description, and by a very good figure facing page 165, drawn by Sir William (then Mr.) Hooker. After a careful comparison of this with a good series of *Q. sclerophylla* Lindl., in my own herbarium, I was led to think that the two species were identical. The only characters which do not correspond are that the fruit-spike is said to be pendulous in *Q. chinensis*, while it is erect in Lindley's species, and that dichotomy of the branchlets, though observable, is not common in the latter. Mr. Carruthers, who examined the specimens with me, was inclined to attach no great importance to these differences. On the other hand, M. Maximowicz writes that his specimens of *Q. sclerophylla* have thinner and less rugose branches, broader leaves, with slighter and more arcuate nerves, and erect fructiferous

spikes; but he adds that the larger series of examples available here may show a closer connection than he had seen between the two. As to these points, I find that the young branches in *Q. sclerophylla* are more or less striate, and the older ones quite as rugose as in the figure of *Q. chinensis*. The leaves of *Q. sclerophylla* vary greatly; the petiole is sometimes 9 lines long, sometimes nearly obsolete; the base is sometimes distinctly rounded, especially in the older and broader leaves, but is oftener more or less attenuated, and there seems to be no constancy on the same specimen, either in the ratio of breadth to length, or in the thickness and arcuation of the always parallel nerves. It may be remarked that, in the figure of Abel's species, there are some leaves much broader than the typical ones.

Under the circumstances, as M. Maximowicz suggests, it seems best simply to regard Abel's *Q. densifolia* and *Q. chinensis* as two additions to the flora of China. Unfortunately, Bunge's very well-known North-Chinese oak, published in 1831 (Enum. Plant. Chin. p. 61), bears the same name of *Q. chinensis*, published by Abel in 1818, and I therefore propose for the former the name of *Q. Bungeana*.

In the sixth volume of the Linnean Society's Journal (pp. 31–33), Mr. Carruthers published 'Notes on some species of Oaks from Northern China, collected by Dr. Daniell,' the specimens of which, at the British Museum, I have lately had an opportunity of studying. At Mr. Carruthers' request I sent leaves of the two undetermined species to M. Maximowicz, and, as was to be expected, the rich Manchurian collections at St. Petersburg have enabled that distinguished botanist to offer some interesting suggestions.

Q. species No. 5 (Carruthers, Journ. Linn. Soc. vi. p. 32) was, in the absence of fruit, distinguished from *Q. serrata* Thbg. by the uniform obovate shape of the leaves, and by the almost obsolete petioles. M. Maximowicz writes:—"I am inclined to think No. 5 the young plant of *Q. chinensis* Bunge (= *Q. Bungeana* F. Forbes). Usually *Q. chinensis* has longer petioled leaves of different shape, but these long petioles occur in innovations or young vigorous shoots, such as bear frequently male catkins. Fruiting specimens have short petioled leaves like your sample. Specimens of young trees in our herbarium have different leaves from the adult, and present actually a middle form between your extreme leaf and the adult type, some leaves of the same branch being nearer to the type, others nearer to your leaf."

Q. species No. 6 (Carruthers, *l. c.* p. 32), which was described, from the leaves only, as probably most nearly allied to *Q. chinensis* Bunge, is considered by M. Maximowicz to be a young tree of *Q. serrata* Thbg. "This," he writes, "in its young state, like *Q. chinensis* Bunge, bears more obtuse and somewhat panduriform leaves (which state is the var. *obtusata* Blume!). I must add that the leaves of *Q. serrata* are glabrate as they get old. Its leaves vary extremely in shape, and I have examples which make me think that *Q. acutissima* Carruth. might also belong here."

Q. ACUTISSIMA Carruthers (*l. c.* p. 33).—In the extract just quoted, M. Maximowicz concurs with M. A. DeCandolle (Prod. xvi. 2, 50), in reducing this species (from its description only) to

Q. serrata Thunb. I possess specimens, from a handsome tree on the Shanghai Bund, which Mr. Carruthers refers to his species, and a careful study of this material leads me to doubt whether its identity with *Q. serrata* has been fully established. The type specimen came from the province of Kiangsi, where, according to the itinerary of Amherst's embassy, it must have been gathered in November, while I gathered mine in April and May. To begin with, I do not find here the same differences in texture and consistency which are noticeable when the spring and autumn leaves of *Q. serrata* are compared. There is at Kew a Japanese specimen from the Leyden Herbarium, labelled by Blume, *Q. serrata*, the leaves of which correspond with Mr. Carruthers' type in their acumination, but differ in being little, if at all, attenuate at the base. My Shanghai specimens have male catkins in various stages, and these I have compared with others gathered by me during the same week, in the neighbouring province of Chekiang, and referred by Dr. Hance to *Q. serrata*. In the latter the flowers are sessile, the perigone lobes are obovate or sub-cucullate, irregularly fimbriate at the margin, cut down nearly to the base, and clothed with hairs, which under the lens have a much more shaggy appearance than those from Shanghai; stamens generally 4, but only 3 in some few flowers on the catkin. In *Q. acutissima* the male flowers are very shortly but distinctly pedicelled, the perigone lobes in the catkin examined are only 3 (there are 4 in *Q. serrata*), ovate or triangular, not cut down more than two-thirds to the base; stamens usually 3, though 4 were found in one or two cases. My specimens have no fruit, and the female flowers are very young, but the styles show a difference from *Q. serrata* in being not dilated, but distinctly notched, at the apex. Staunton's plant, which served as type, has no acorn, but only a cupule, the scales of which are adpressed more closely and for a much longer distance upwards than in any of *Q. serrata* which I have examined. On the whole, it seems to me that the question of merging *Q. acutissima* in *Q. serrata* can only be decided by the study of fuller materials, which should be easily forthcoming, as the former tree is not uncommon in the Shanghai district.

Q. GLAUCA Thunb.—The first record of this species in China was made in 1875, by Dr. Hance,* who had received it from the provinces of Fokien and Chekiang. I have a specimen, gathered by my friend, Mr. Carles, at Ning-kong-jao, in Chekiang, and there are two of Fortune's in the British Museum (No. 71, from Chinkiang, in Kiangsu, and another from Chekiang). The leaves run from ovate to obovate-acuminate, the serrations vary in depth and are sometimes mucronate, and the under surface of all is velvety, with prominent parallel costules. They match a Japanese specimen at Kew, received from the Leyden Herbarium. There is also at Kew a specimen gathered by Mr. Maries in the Lushan Hills (Kiangsi), which is probably one of Blume's varieties of this species.

* Journ. Bot. 1875, p. 363.

Q. Vibrayeana Franch. & Sav. (Enum. Pl. Jap. ii. 498).—There are, both at the British Museum and at Kew, two unnamed specimens brought by Fortune, in 1854, from the Chekiang Hills, which I found to be identical with a Japanese specimen in my herbarium, collected by M. Maximowicz in 1863, at Naga-yama, and distributed by him under the label "*Q. glauca?* Thbg., var.?" In reply to my inquiry, M. Maximowicz informs me that since his distribution he has found that his specimen matches exactly Blume's type at Leyden, of *Q. myrsinæfolia*, but that it matches equally well with Franchet and Savatier's *Q. Vibrayeana*. The former species has fruit in axillary clusters, two or three together, and the latter has them in spikes; but, in the absence of any fruit at all on his own specimens, M. Maximowicz had been unable to decide the question. It happens that Fortune's and my specimens have good fruit, and their characters agree so well with Franchet and Savatier's diagnosis that I have no hesitation in referring the Chekiang tree to this species, which is now first recorded from China.

Fortune's ticket bears the memorandum, "*Quercus* sp., on which *Dicronocephalus* feeds"; and Prof. Oliver was good enough to draw my attention to a note by Fortune in the 'Gardeners' Chronicle,'* where the tree is mentioned as *Q. bambusæfolia*. It is evident that this must be treated as a mere gardener's name, for the species differs in many respects from that which Dr. Hance had so designated in the 'Botany of the Voyage of the Herald' (tab. xci.), and which he maintains† was wrongly referred to *Q. salicina* Bl. by Seemann, the error being perpetuated in the 'Flora Hongkongensis.'

Q. gilva Blume. I have from Mr. Carles specimens gathered by him on July 31st, 1881, on the Island of Poo-too (Chusan Archipelago). They agree with Kew specimens from Japan, the only country where this species had previously been found.

The following is a list of the species of oaks which I have recorded as known from China. There are at Kew and the British Museum a few other Chinese specimens not yet critically determined, and which are therefore not included in my list.

Q. acutissima Carruthers. Kiangsi; Kiangsu.

Q. aliena Bl. Pechili; Anwhei.

Q. bambusifolia Hance. Hongkong (*Q. salicina* Fl. H. K.)

Q. Bungeana mihi. (*Q. chinensis* Bunge *non* Abel). Pechili; Shantung; Shingking.

Q. Championi Benth. Hongkong.

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* "*Q. bambusæfolia*. The fine evergreen oak sold under this name was found wild on the mountains of the Chekiang province. Full-sized trees are from 30 to 50 feet high, and are very ornamental. It may interest entomologists to know, that the beautiful and rare *Dicronocephalus Wallichii* was generally found on this species. This oak is supposed to be hardy in England, and if so, it will be a valuable introduction. It is probably distinct from the Hongkong species which has been published under this name."—Gard. Chron. 1860, p. 170. The reference in the 'Prodromus,' xvi. 2, p. 100, under *Q. salicina* Bl. to "*Q. bambusæfolia* Hance MSS. (Lindl. in Gard. Chron. 1860, p. 46, e. Chekiang)," is evidently a misprint, nor have I been able to trace anything from Lindley's pen on this subject.

† Journ. Bot 1875, p. 364.

Q. chinensis Abel. Kiangsi.
Q. cornea Lour. Hongkong; S. China.
Q. cuspidata Thbg. Corea.
Q. densifolia Abel. Kiangsi.
Q. dentata Thbg. Pechili; Shingking; Shantung; Corea.
Q. Eyrei Champ. Hongkong.
Q. Fabri Hance. Kwangtung; Chekiang; Kiangsu; Anwhei; Kiangsi; Corean Archipelago (?.)
Q. fissa Champ. Hongkong.
Q. gilva Bl. Chusan Archipelago.
Q. glandulifera Bl. Chekiang; Kiangsi; Corean Archipelago.
Q. glauca Thbg. (*Q. annulata* Sm.) Kwangtung; Fokien; Chekiang; Kiangsu; Kiangsi.
Q. Hancei Bthm. Hongkong.
Q. Harlandi Hance. Hongkong; S. China.
Q. Irwinii Hance. Hongkong.
Q. MacCormickii Carr. Shingking.
Q. mongolica Fisch. Pechili; Shantung; Shingking.
Q. Moulei Hance. Chekiang.
Q. obovata Bunge. Pechili; Shingking.
Q. sclerophylla Lindl. Hongkong; Kwangtung; Fokien; Chekiang; Kiangsu; Kiangsi; Chusan (?).
Q. serrata Thbg. Shingking; Shantung; Kiangsu; Chekiang.
Q. thalassica Hance (*Q. inversa* Lindl.) Hongkong; North China (in Herb. Mus. Brit. *sine loco*); Chusan (Herb. Sloane).
? *Q. urticæfolia* Bl., et var. β. *brevipetiolata* A. DC. China (ex Prod. xvi. 2, p. 16).
Q. Vibrayeana Franch. & Sav. (*Q. bambusæfolia* Hort. *non* Hance). Chekiang.

A SYNOPSIS OF THE GENUS *SELAGINELLA*.

By J. G. Baker, F.R.S., &c.

(Continued from p. 26.)

110. S. lingulata Spring Monog. ii. 224; *S. microtus* A. Br.—Stems trailing, reaching a foot in length, slender, flat on the back, bisulcate on the face, jointed at the nodes, copiously pinnate, with elongated ascending laxly compound branches. Leaves of the lower plane spaced on the branchlets, very much so on the main stem, spreading, oblong, subobtuse, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green and moderately firm in texture, rather more produced on the upper side of the midrib, very obscurely ciliated, laterally attached and truncate at the base; leaves of the upper plane $\frac{1}{3}$–$\frac{1}{2}$ as long, oblique oblong, acute. Spikes $\frac{1}{4}$–$\frac{3}{4}$ in. long, 1 lin. diam., square; bracts ovate-lanceolate, crowded, strongly keeled.

Hab. Andes of Ecuador, *Jameson! Spruce* 4790! 5603! New Granada, *Sodiro*!

111. S. Lindigii A. Br. in Crypt. Nov. Gran., 381.—Stems trailing, reaching a foot in length, flat on the back, bisulcate on

the face, jointed at the nodes, copiously pinnately branched, the branches copiously compound. Leaves of the lower plane much spaced, spreading, oblong-lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, very unequal-sided, the lower margin parallel with the midrib, the upper rounded, laterally attached, truncate at the base, very obscurely ciliated; leaves of the upper plane half as long, oblong, acute, not cuspidate. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, square, 1 lin. diam.; bracts ovate-lanceolate, strongly keeled.

Hab. Andes of New Granada, *Lindig* 1507! *Holton* 83! Ecuador *Spruce* 4798! 5676! Scarcely more than a variety of *lingulata*.

112. S. Kraussiana A. Br. in Ind. Sem. Hort. Berol. 1859, 22; *S. mnioides* Spring, ex parte; *S. hortensis* Mett.; *Lycopodium Kraussianum* Kunze; *L. denticulatum* Hort.—Stems trailing, $\frac{1}{2}$–1 ft. long, jointed at the nodes, flat on the back, subterete on the face, copiously pinnate, with copiously compound erecto-patent branches. Leaves of the lower plane contiguous on the branchlets, spaced on the branches and main stem, oblong-lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green, moderately firm in texture, a little more produced on the upper side of the midrib, ciliated and broadly rounded at the base and a little imbricated over the stem; leaves of the upper plane a third as long, oblique ovate, acute, not cuspidate. Spikes short, square, $\frac{3}{4}$–1 lin. diam.; bracts ovate-cuspidate, strongly keeled.

Hab. Cape Colony, Natal, Fernando Po, Cameroon Mountains, Azores, Madeira, and reported also from Sicily. The commonest species in gardens, where it is often grown under the name of "*Lycopodium denticulatum*." *S. Brownii* Hort. Stansfield, is a dwarf variety from the Azores. I cannot distinguish from this species *S. remotifolia* Spring in Plant Junghuhn, 276, from the mountains of Java, and *S. japonica* Miquel, Prolus, 349, from Japan, which has already been referred to *Kraussiana* by Franchet and Savatier.

Group IV.—Apodæ.

113. S. spinulosa Spring in Pl., Junghuhn, 277, non A. Br.—Stems very slender, trailing, 1–2 in. long, little branched. Leaves of the lower plane spaced even on the branchlets, oblong, obtuse, $\frac{1}{2}$ lin. long, pale green, membranous, more rounded on the upper side at the base and strongly ciliated; leaves of the upper plane one-third to one-fourth as long, oblong, acute. Spikes short, square, $\frac{1}{2}$ lin. diam.; bracts ovate cuspidate, strongly keeled.

Hab. Java, *Zollinger* 2011! A near ally of *S. rotundifolia*.

114. **S. Savatieri,** n. sp.—*S. denticulata* Franch. & Savat. Enum. Jap. ii. 198, non Link. — Stems trailing, 2 in. long, sparingly pinnately branched, the branches erecto-patent, the lower forked, the upper simple. Leaves of the lower plane spaced, spreading, a line long, oblique ovate, acute, pale green, rather firmer in texture than in *integerrima*, more produced on the upper side of the midrib, very cordate, shortly ciliated and much imbricated over the stem on the upper side at the base: leaves of the upper plane half as

long, oblique ovate, acute, not cuspidate. Spikes ½–1 in. long, ¾–1 lin. diam., sometimes forked; bracts ovate cuspidate, similar in texture to the leaves, neither dense nor acutely keeled. Macrospores finely echinulate.

Hab. Japan, in the island of Nippon, *Savatier*! Very near *nipponica*, from which it differs by its more cordate leaves and muricated macrospores.

115. S. NIPPONICA Franch. & Savat. Enum. Jap. ii. 199.—Stems trailing, 2–4 in. long, pinnately branched, the branches erecto-patent, the upper simple, the lower slightly compound. Leaves of the lower plane contiguous upwards, spaced and spreading or rather deflexed on the lower part of the stem, oblique ovate or oblong, acute, a line long, pale green, firmer in texture than in *S. apus*, unequal-sided, more produced on the upper side of the midrib, slightly cordate, shortly ciliated and slightly imbricated over the stem at the base; leaves of the upper plane half as long, oblique oblong, acute, not cuspidate. Spikes ½–1 in. long, 1 lin. diam.; bracts uniform or slightly dimorphic, similar to the leaves in texture, ovate cuspidate, not dense, nor strongly keeled.

Hab. Japan, in the island of Nippon, *Thunberg*! *Savatier*! *Bissett*! Differs from *S. integerrima* mainly in its laxer, less acutely-keeled bracts. There is a specimen of this from Thunberg in the Smithian herbarium, so that it is doubtless the *Lycopodium ornithopodioides* of his 'Flora Japonica.'

116. S. INTEGERRIMA Spring Monog. ii. 79; *L. integerrimum* and *ornithopodioides* Hook. & Grev. — Stem trailing, very slender, reaching a length of ½–1 ft., flat on the back, bisulcate on the face, irregularly forked low down, the pinnately arranged branches distant, short and but little compound. Leaves of the lower plane crowded and ascending on the branchlets, spaced and spreading or deflexed on the main stem, oblique oblong, subacute, 1-12th in. long, bright or pale green, membranous, more produced on the upper side of the midrib, not at all ciliated, rounded on both sides at the base, but only imbricated over the stem on the branchlets; leaves of the upper plane one-third to one-half as long, oblique, ovate, acute. Spikes square, ¼–½ in. long, 1–1½ lin. diam.; bracts ovate-lanceolate, strongly keeled.

Hab. Ceylon, in the warmer parts of the island, *Kœnig*! *Gardner*! *Thwaites* 3280! This is the *Lycopodium ornithopodioides* of the Linnean herbarium. We have closely allied plants from Japan, gathered by Oldham; from the Macalisberg range, in South Africa, gathered by Sanderson; from Bourbon, gathered by Dr. I. B. Balfour, with leaves of upper plane narrower and shortly cuspidate; and from Chusan, gathered by Alexander, with more rigid smaller acute leaves of both kinds, which will likely prove distinct; but none of the specimens are in fruit, and they may be platystachyoid.

117. S. EXIGUA Spring Mon. ii. 238; *Lycopodium aristatum* Roxb.? *S. aristata* J. Scott? non Spring.—Stems densely tufted, 1½–2 in. long, very slender, decumbent, with slender root-fibres in the lower half, closely pinnate, with compound lower branches.

Leaves of the lower plane crowded on the branches, spaced on the main stem, oblique ovate, acute, a line long, pale green, membranous, cordate and shortly ciliated on the upper side at the base and imbricated over the stem. Leaves of upper plane little smaller, oblique ovate, acute, shortly cuspidate. Spikes short, copious, 1 lin. diam.; bracts ovate, acute, strongly keeled, similar to the leaves in texture.

Hab. Assam and Mergui, *Griffith*! Resembles *S. proniflora* in leaves and general habit.

118. S. PINANGENSIS Spring Monog. ii, 205. — Stems entirely trailing, very slender, sulcate on the face, about 1½ ft. long, closely pinnate, the central branches with 3–4 short contiguous branchlets. Leaves of the lower plane close on both stem and branches, spreading, oblong, obtuse, 1-12th to 1-8th in. long, pale green, membranous, nearly equal-sided, rounded at both sides at the base, a little imbricated over the stem on the upper side, shortly ciliated through the lower half of the upper side; leaves of the upper plane one-third as long, oblique ovate, with a cusp nearly as long as the blade. Spikes short, square, ½ lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Penang, *Gaudichaud*; Assam, *Jenkins*! Closely resembles *serpens* in general habit.

119. **S. tectissima,** n. sp.—Stems filiform, trailing, intermatted, flat on the face, 1½–2 in. long, the few short branches simple or little compound. Leaves of the lower plane spreading, contiguous or slightly spaced, ovate-deltoid, acute, bright green, membranous, not more than ½ lin. long, very unequal-sided, very cordate and strongly ciliated on the upper side at the base and much imbricated over the stem, the leaves of the opposite side considerably overwrapping each other; leaves of upper plane half as long, ovate, with a distinct cusp. Spikes short, ½ lin. diam., square; bracts ovate, acute, membranous, strongly ciliated, sharply keeled.

Hab. Macalisberg mountains, along with the plant mentioned under *S. integerrima*, Sanderson!

120. **S. Mackenii,** n. sp.—Stems filiform, trailing, intermatted, 3–4 in. long, sulcate both on back and face, forked low down, the few pinnate ascending branches simple or little compound. Leaves of the lower plane spreading, contiguous on the branchlets, spaced on the main stem, oblong, subacute, 1-12th in. long, pale green, membranous, more produced on the upper side of the midrib, cordate and shortly ciliated and a little imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, oblique ovate, acute, not cuspidate. Spikes very short, square, 1 lin. diam.; bracts ovate-lanceolate, membranous, strongly keeled.

Hab. Banks of the Tugela river, *Gerrard & McKen* 237! A near ally of *S. integerrima*.

121. **S. Cooperi,** n. sp.—Stems intermatted, trailing, filiform, 2–3 in. long, flat on the back, bisulcate on the face, the few erecto-patent branches sparingly compound. Leaves of the lower plane contiguous and ascending on the branches, rather spaced and

spreading on the main stem, oblong, acute, 1-12th in. long, membranous, rather unequal-sided, cordate and strongly ciliated and imbricated over the stem on the upper side at the base; leaves of the upper side half as long, ovate, with a short cusp. Spikes ¼ in. long, square, 1 lin. diam.; bracts ovate-lanceolate, membranous, strongly keeled in the upper half.

Hab. Orange Free State, *Cooper* 1056! Between *albo-nitens* and *integerrima*.

122. S. ROTUNDIFOLIA Spring Mon. ii. 85; Fee Fil. Ant. t. 34, fig. 2.—Stems very slender, trailing, intermatted, 2–4 in. long, the distant branches short and simple. Leaves of the lower plane spaced, spreading, suborbicular, cuspidate, ½ lin. long, pale green, membranous, nearly equal-sided, rounded on both sides at the base, shortly ciliated on the upper, not imbricated over the stem; leaves of the upper plane one-third as long, ovate, acute, not cuspidate, not imbricated. Spikes very short, square, ½ lin. diam.; bracts ovate, acute, membranous, strongly keeled.

Hab. West Indies: St. Vincent, Martinique, Guadeloupe, &c., *Husnot* 579!

123. S. ovifolia, n. sp.—Stems filiform, trailing, 1–2 in. long, the distant branches short and simple. Leaves of the lower plane close, spreading, ovate, acute, ½ lin. long, bright green, membranous, nearly equal-sided, distinctly ciliated on both margins, rounded on both sides at the base, not imbricated over the stem; leaves of the upper plane a quarter as long, oblique ovate, acute. Spikes very short, ½ lin, diam.; bracts ovate, acute, membranous, strongly keeled.

Hab. Porto Rico, *Schwanecke*! A near ally of *S. rotundifolia*.

124. S. macilenta, n. sp.—Stems very slender, filiform, trailing, intermatted, 3–4 in. long, little branched, often excurrent and flagellate at the tip, with the leaves rudimentary. Leaves of the lower plane spaced, spreading, oblique ovate, acute, ½ lin. long, much more produced on the upper side of the midrib, broadly rounded on the upper side at the base, not ciliated, not imbricated over the stem; leaves of the upper plane a quarter as long, oblique ovate, acute, not imbricated. Spikes short, ½ lin. diam.; bracts ovate-lanceolate, membranous, strongly keeled.

Hab. On stones at the foot of Mount Chimborazo, at an altitude of 3000 feet, *Spruce*! A near ally of *S. rotundifolia*.

125. S. armata, n. sp.—Stems filiform, trailing, 1–2 in. long, the distant pinnately arranged branches simple or forked. Leaves of the lower plane contiguous and ascending towards the tip of the branches, spaced and spreading on the main stem, ovate or oblong, acute, ⅓ lin. long, conspicuously ciliated on both sides from base to tip, pale green, membranous, rather more produced on the upper side of the midrib, cordate at the base and imbricated over the stem; leaves of the upper plane half as long, oblique oblong, acute, strongly ciliated. Spikes short, square, ½ lin. diam.; bracts ovate-lanceolate, strongly keeled, conspicuously ciliated.

Hab. Cuba, *Wright* 3908!

(To be continued.)

SHORT NOTES.

Erythræa capitata, var. sphærocephala.—On turning over a collection of Channel Island plants, made in 1876, in company with my friend Dr. Fraser, my attention was attracted by a small tuft of *Erythræa*, which appeared to me to resemble fig. 2 in the frontispiece to the 'Flora of Hampshire' (Journ. Bot. 1883, t. 236). A dissection of the single flower which the plant possessed showed the filaments free to the base of the tube of the corolla, so that there was little doubt of the identity of the species. Mr. Townsend himself having been so obliging as to examine the specimen and to confirm my impression, this species must now be admitted as a legitimate member of the Sarnian Flora. My specimen was gathered on the 1st of July, 1876, in the northern end of the Island of Guernsey, and, I believe, on L'Ancresse Common. It will probably be found in Western France, and possibly in Belgium.—Wm. Mathews.

[Mr. Baker informs us that the plant has also been found in Oeland by Dr. F. Areschoug.—Ed. Journ. Bot.]

Juncus tenuis Willd., in England.—In crossing a rough and rushy pasture, in the parish of Cradley, Herefordshire, a few weeks ago, I met with a plant which at first sight I took to be *Juncus compressus* Jacq., but which a further examination showed to be amply different from that rush. Mr. William Mathews, to whom I sent specimens, at once gave his opinion that the plant was *J. tenuis* Willd., and Mr. J. G. Baker has since confirmed his determination. To me it is particularly interesting, as suggesting that Don's plant, mentioned in 'English Botany,' eds. 1 and 2, was also really *J. tenuis*. In edition 1 it is thus noticed: "Found by Mr. G. Don, in 1795 or 1796, by the side of a rivulet, in marshy ground, among the mountains of Angusshire, but very rarely." It is described in this edition under the name of *Juncus gracilis*, but figured as *J. Gesneri*. In edition 2 it is described and figured as *J. Gesneri*, with *J. gracilis* and *J. tenuis* given as synonyms. In the figure the bracts are shown much shorter than in specimens I have gathered. So far as I have seen it is confined to a single tuft, but possibly it may prove to be more widely distributed.—R. F. Towndrow.

Kerry Plants.—During an excursion through southern Kerry, in August, 1883, I collected several plants not hitherto recorded from that county, or interesting as being from new localities. *Radiola Millegrana* occurred on a sandy place by the road near Cove. *Campanula rotundifolia*, which is rare in western Ireland, occurred on wet rocks at Mangerton, and on the Purple Mountain, in company with *Sedum Rhodiola* and other alpines. *Euphrasia viscosa* was remarkably abundant in the marshes, and even in damp spots by the roadsides, throughout the whole district, from near Bantry to Dingle. *Solanum Dulcamara*, not recorded from Kerry in 'Cybele Hibernica,' grew on a wall between Killarney and Mucross. *Hieracia* were remarkably scarce. *H. anglicum* occurred in plenty in the Horses

Glen, Mangerton, with *H. iricum*, which also occurred on the Purple Mountain. *Veronica Buxbaumii* grew in the beds of the gardens at the hotel at Mucross and Glencar, and also on the shore of Bantry Bay, near Glengariff, in Cork. It is strange to see this comparatively recent introduction into the British Isles in parts of Ireland not yet reached by much older introductions, such as the poppies and fumitories. *Empetrum nigrum*, reported rare in the south of Ireland by Dr. Moore, was plentiful on the summit of the Purple Mountain. *Ceratophyllum demersum*, not recorded for Kerry in 'Cybele Hibernica,' occurred abundantly in a pool at the foot of Ross Castle, Killarney. *Eriocaulon septangulare* was growing plentifully in a small lake, on the road to Sneem from Kenmare, at about four miles from the former place, in company with *Cladium Mariscus*, *Eleocharis multicaulis*, *Nymphæa alba* and *Lobelia Dortmanna*. This is a new locality, connecting that of the Cromeen with the Carra Lakes. *Carex rigida* was growing with *Saussurea alpina* in long grass, in the upper part of the Horse's Glen, at Mangerton, and *Aira alpina* also occurred on the rocks at the same place, above the first lake. It is not recorded in the 'Cybele Hibernica' for Ireland. *Poa supina* Schrad. (an alpine form of *P. annua*) grew on the wet stones and in the water of the streams descending from Carn Tual.—H. N. Ridley.

West Norfolk Plants. — On looking over the records for county 28 in 'Topographical Botany' I find that I possess the following unrecorded species for that county:—*Lotus tenuis* Kit. Hunstanton. — *Filago spathulata* Presl. Heacham; Docking Common. — *Crepis taraxacifolia* Thuil. Hunstanton, found by Herbert F. Fryer. — *Littorella lacustris* L. In a pool on Docking Common. — *Koeleria cristata* Pers. Hunstanton, H. F. Fryer. — *Triticum junceum* L. Hunstanton. — Alfred Fryer.

NOTICES OF BOOKS.

Nouvelles Remarques sur la Nomenclature botanique, par M. Alph. de Candolle. Genève: Georg. 1883. 79 pp. 8vo.

The purport of this pamphlet is set forth on the title-page as a 'Supplément au Commentaire du même auteur qui accompagnait le texte des lois.'

Since 1867, when the 'Lois de la Nomenclature botanique' were issued by M. Alph. de Candolle, with a running commentary on certain points, many questions have arisen which were not foreseen during the period of drafting the laws. Naturally these questions were referred to the paramount authority of the author of the Commentary, and from time to time opinions have been published concerning them. Discussions have also taken place on these topics, as the pages of this Journal abundantly show. M. de Candolle has therefore consolidated his replies, and has here issued

them with some new suggestions. We may briefly summarise the new features in this edition of the Laws.

The Introduction mentions several attempts at drawing up codes of nomenclature, chiefly on the part of zoologists and geologists. Next follow observations and discussion on certain Articles of the laws issued in 1867; with additional Article, 15 bis.

The much debated Art. 50 of the original laws is also treated here at length.

The Second Part consists of new questions, on which no declaration was made by the Paris Congress of 1867. These are:

1. Nomenclature of organs.
2. Nomenclature of fossils.
3. Nomenclature of groups of lower rank than varieties.
4. When an author has united one genus with another, without naming the species, can he be quoted for each specific name implied by the union?
5. Capital or small letters for specific names.
6. Additional remark on the names of the great divisions or classes of the vegetable kingdom.

Part Three is devoted to a recapitulation of the old laws, with some proposed additions, arising from the foregoing consideration.

The new Articles, exclusive of changes in the wording, or new sentences, are these:—

Art. 7 bis. Les règles de la nomenclature botanique s'appliquent à toutes les classes du règne végétal, et aux plantes fossiles comme à celles acutellement vivantes.

Art. 10 bis. Lorsqu'il s'agit de plantes fossiles, les formes qui se sont succédé, et qu'on estime pouvoir être rapportées à une même espèce sont appelées des mutations.

Art. 15 bis. La désignation d'un groupe, par un ou plusieurs noms, n'a pas pour but d'énoncer des charactères ou l'histoire de ce groupe, mais de donner un moyen de s'entendre lorsqu'on veut en parler.

Art. 50 (recast). Lorsqu'un nom inedit a été publié en l'attribuant à son auteur, les personnes qui le mentionnent plus tard doivent ajouter le nom de celui qui a publié; exemple: Leptocaulis Nuttall in D.C.; Oxalis lineata Gillies in Hooker.

Art. 66 (recast). Un nom de genre doit subsister tel qu'il a été fait, à moins qu'il ne s'agisse de corriger une erreur purement typographique. La désinence d'un adjectif latin de nom d'espèce peut être modifiée pour la faire accorder avec le nom generique.

We hope shortly to take up the whole of the points newly set forth; in the meantime we trust that this outline may suffice.

B. D. J.

New Books. — H. Baillon, 'Le Jardin Botanique de la Faculté de Médecine de Paris' (8vo, pp. iv., 180 (map): Paris, Doin, 5 *fr.*). — A. Lavallée, 'Les Clematites à grandes Fleurs' (4to, pp. xii., 84, tt. 22: Paris, Baillière). — J. C. Sauzé & P. N. Maillard, 'Flore des Deux-Sèvres' (8vo, ed. 2, pt. 1, pp. xxxi.,

343: Paris, Baillière). — C. Leonhardt, 'Vergleichende Botanik für Schulen' (8vo, pt. i., pp. xiii., 112, 8 plates: Jena, Mante).— J. D. Hooker, 'Flora of British India,' part xi. (L. Reeve & Co.: pp. 257–512; *Scrophularineæ* to *Acanthaceæ*). — S. Vidal, 'Sinopsis de familias y géneros de Plantas Lenosas de Filipinas' (Manila, Chofré: 1 vol. (text) 8vo, pp. xviii., 414; 1 vol. (plates) fol., pp. xliv., tt. 100). — H. Friend, 'Flowers and Flower-Lore' 2 vols., pp. xvi., 704 (London, Sonnenschein, 16*s.*). — J. Macoun, 'Catalogue of Canadian Plants: i., Polypetalæ' (Montreal, Dawson: 8vo, pp. ix., 192). — G. Coccone, 'Flora della provincia di Bologna' (8vo, pp. xix., 583: Bologna, Zanichelli). — F. Antoine, 'Phyto-iconographie der Bromeliaceen' (text, 4to, pp. viii., 6: 5 fol. plates: Wien, Gerold).

Articles in Journals.

American Naturalist. — J. B. Ellis & G. Martin, 'New Florida Fungi' (*Isariopsis clavata*, *Phyllosticta fraxini*, *P. catalpæ*, *Ramularia orontii*, *R. andromedæ*, *Cercospora perseæ*, *C. heucheræ*, *Macrosporium Martindalei*).

Ann. & Mag. Nat. Hist. — R. Kidston, 'On a Specimen of *Pecopteris* (*? polymorpha* Brongn.) in circinate venation, with remarks on *Spiropteris* and *Rhizomopteris*.' — Id., 'New Species of *Schutzia* (*S. Bennieana*) from the Calciferous Sandstones of Scotland' (1 plate). — F. Schmitz, 'On the Fertilization of the *Florideæ*' (1 plate).

Botanical Gazette. — A. P. Morgan, 'Memoir of L. D. de Schweinitz (1794–1834). — F. S. Earle, 'N. American forms of *Podosphæria*.'

Bot. Centralblatt (No. 5). — E. Henser, 'Beobachtungen über Zellkerntheilung' (2 plates). — —. Rothpletz, Memoir of Oswald Heer (portrait). — (Nos. 6, 7, 8). A. F. W. Schimper, 'Ueber Bau u. Lebensweise der Epiphyten Westindiens.'

Botanische Zeitung (Feb. 1). — E. Zacharias, 'Ueber den Inhalt der Siebröhen von *Cucurbita Pepo*.'—(Feb. 8, 15). T. W. Engelmann, 'Untersuchungen über die quantitativen Beziehungen zwischen Absorption des Lichtes und Assimilation in Pflanzenzellen.' — (Feb. 22). O. Loew, 'Noch einmal über das Protoplasma.'

Botaniska Notiser. — C. Kaurin, 'Fra Opdals Mosflora' (*Bryum clavifer*, sp. n.). — E. Ljungström, 'Växtgeografiska bidrag till Skånes flora.' — Id., 'Om några Könsforhall anden och därmed i sammanhang stående modifikationer i blommans bygrad hos en del Syngenesister.'

Bulletin of Torrey Bot. Club (Jan.). — J. Schrenk, 'Notes on Tuckahoe' (1 plate).—F. L. Scribner, 'New N. American Grasses' (*Boutelua trifida* Thurber, *B. Burkii* Scribn., *B. Havardi* Vasey, *B. pusilla* Vasey, *Trisetum Hallii* Scribn.). —. G. Vasey, *Ammophila Curtissii*, n. sp.

Garden (Feb. 9).—*Vanda Sanderiana* (ic. pict.).

Gardeners' Chronicle (Feb. 2). — *Caryopteris mastachanthus* (fig. 30).—W. G. Smith, 'Sand and Fungus Spores.' — (Feb. 9). *Masdevallia pachyantha* Rchb. f., *Saccolabium bellinum* Rchb. f., spp. nn. —C. B. Plowright, '*Barya aurantiaca*' (figg. 32–34). — (Feb. 16). *Aerides Rohanianum* Rchb. f., *Oncidium endocharis* Rchb. f., spp. nn. —J. H. Krelage, '*Iris reticulata cyanea—I. histrio*' (fig. 41–44).

Knowledge (Feb. 1, 22).—G. Allen, 'The Evolution of Flowers.'

Midland Naturalist. — J. E. Bagnall, 'Flora of Warwickshire' (*Labiatæ*).

Nature (Jan. 31). — G. Schweinfurth, 'Further Discoveries in the Flora of Ancient Egypt.'

Naturalist. — G. Massee, 'Primary Causes of Variety in Plant-Structure.'

Oesterr. Bot. Zeitschrift. — F. Lorinser, 'Ein neuer Pilz' (*Agaricus* (*Pleurotus*) *sulcato-jugatus*). — J. B. Wiesbaur, 'Die Rosenflora von Travnik in Bosnien' (contd.). — J. A. Bäumler, 'Die Moosflora von Pressburg in Ungarn.'—H. Zukal, 'Bacterien als directe Abkömmlinge einer Alge.' — B. Blocki, 'Ein Beitrag zur Flora Galiziens und der Bukowina' (contd.). — A. Tomaschek, 'Ueber Darwin's Bewegungsvermögen der Pflanzen.'—V. v. Borbás, 'Die Nadelholzwälder des Eisenburger Comitates.'

Pharmaceutical Journal (Feb. 16).—J. Ince, 'Abraham Munting 'De Vera Antiquorum Herba Britannica.'' — B. H. Paul, 'Report on Analyses of Specimens of Cinchona Bark from India.'

Science-Gossip. — W. H. Harris, 'Fossil Plants in the Silurian Formation near Cardiff.'

Science Monthly. — G. C. Chisholm, 'Lessons from Common Plants.'

BOTANICAL NEWS.

Mr. G. S. Boulger is about to prepare a new edition of Gibson's 'Flora of Essex,' and will be glad of assistance. The Flora will be re-arranged according to river-basins, and the literature of the subject thoroughly worked up. Mr. Boulger wishes to have every form recorded authenticated by a specimen in his herbarium. Mr. Boulger is also collecting materials for biographical notices of Thomas Webb Dyer, M.D., of the Bristol Infirmary, and of Richard Warner, author of the 'Plantæ Woodfordiensis.'

Dr. Bayley Balfour has been appointed Sherardian Professor of Botany at Oxford. There were six candidates, and the electors were Sir John Lubbock, Professor Babington, the President of Magdalen, Professor Bartholomew Price, Professor Moseley, the Bishop of Winchester, and Sir Joseph Hooker. The duty of the Professor is to lecture and give instruction in botany. He will also have charge and supervision of the Botanical Gardens and of

the botanical collections belonging to the University, and it will be part of his duty to make the gardens and collections accessible to and available for the instruction of students attending his lectures. A fellowship in Magdalen College is attached to the professorship. The Professor will be entitled to the emoluments derived from the benefaction of W. Sherrard, Doctor of Civil Law, and assigned to the professorship, and also to the emoluments appropriated to the professorship by the statutes of Magdalen College. The combined emoluments of the office from these sources will be £500 a year. The Professor will be subject to the statutes of the University in regard to the professorship, and to the statutes of Magdalen in regard to the fellowship. The Professor will also receive £200 a year out of the Common University Fund, provided that he conform to the particular regulations to which the professors are subject. A residence is also provided for the Professor in the garden, rent free.

The study-set of the very large collections recently made by Mr. H. O. Forbes in Java, Sumatra, Amboya, Timor, and Keeling Island, have been acquired for the British Museum Herbarium, to which have lately been added the type-collections of Algæ belonging to the late Dr. Dickie, and the Rose-herbarium of the late M. Déséglise.

Mr. Townsend is anxious to obtain good collections of the English mints. Address, stating terms, Honington Hall, Shipston-on-Stour.

Dr. John Hutton Balfour died on Feb. 11th. We hope to give a notice of his life next month.

The Council of the Royal Society have appointed a committee, consisting of Messrs. Ball, Carruthers, Dyer, and Oliver, to prepare a catalogue of the known plants of China, and have placed £200 at their disposal for this purpose. The committee have secured the co-operation of Mr. F. B. Forbes, who, during a residence of many years in China, devoted considerable attention to its flora, and since his residence in England has had prepared, at his own expense, catalogues of all the Chinese plants contained in the Herbaria of the British Museum and the Royal Gardens, Kew. It is proposed that these catalogues and numerous additional materials in the possession of Mr. Forbes shall be the basis of the enumeration, and that Mr. Hemsley be asked to assist in the work.

A rumour from China was received last month that Dr. Hance's valuable herbarium and library had been destroyed during the serious riot of the natives on the British Concession at Canton last year. It will be a satisfaction to Dr. Hance's numerous friends to know that letters just received from him make no mention of such a calamity, although he must have passed a *mauvais quart d'heure* during the disturbance.

ON THE COMPARATIVE MORPHOLOGY OF *SCIADOPITYS*.

By Maxwell T. Masters, M.D., F.R.S.

The opportunity which I have recently had of examining specimens, in various stages of growth, of the curious Umbrella Pine of Japan, *Sciadopitys verticillata*, leads me to offer the following notes, which, though fragmentary, may help to fill up our knowledge of the plant and its allies. The evidence I have been able to collect enables me to lay down these propositions:—

1. That the true leaves of *Sciadopitys* are the homologues of the true or primordial leaves of *Pinus*.

2. That the "needles"* of *Sciadopitys*, although they occupy the same relative position as the "needles" of *Pinus*, are not necessarily of the same morphological significance.

3. That the bracts of the cone of *Sciadopitys* are homologous with the true leaves of that plant, and also with the bracts of *Abietineæ* generally.

4. That the seed-scales of the cones of *Sciadopitys* are the equivalents of the corresponding parts in *Abietineæ*.

5. That the adult seed-scale of *Sciadopitys* and of *Abietineæ* occupies the same apparent position with regard to the bract that the "needle" of *Sciadopitys* and the fascicle of "needles" of *Pinus* (with its sheath) respectively do to the true leaf.

6. That although the apparent position is the same between the parts just mentioned, it does not follow that their morphological significance is identical, inasmuch as their origin may be different.

7. That in proliferous cones of various species, the bract may become leafy, or it may remain in the condition of a bract-scale as in *Sciadopitys*.

8. That in such proliferous cones the seed-scales may be present, in a more or less complete state, while in other cases they may be altogether absent.

9. That when in proliferous cones the seed-scale is absent, its place may be occupied by a "needle," as in *Sciadopitys*, or by a tuft of needles, as in *Pinus*; but it does not follow that that that needle or that tuft is the morphological equivalent of the seed scale, inasmuch as the origin of needle and scale is different.

On each of these points I propose to offer some remarks, based more particularly on my own observations, and with only such incidental reference to the copious literature of the subject as may be essential.

The nature of the true leaves of Sciadopitys:—The comparison of the leaves on the branches of this plant with the primordial leaves, and it may be added with the cotyledon, of *Pinus* is in itself sufficient to establish this proposition, which may be supported by the statement that the anatomical conformation is essentially the same in

* I use this word advisedly, in order not to predicate prematurely anything as to the exact nature of these members.

all, the xylem being above, the phloem below,* the chief difference consisting in the absence of the "bundle-sheath" from the leaf of *Sciadopitys*. If confirmation were needed it might be obtained from an examination of the seedling plant.

Germination of Sciadopitys.—The seedling plant has a long monopodially-branched tap-root or radicle, a long cylindrical caulicle or tigellum, tapering a little towards its upper end, where it bears two sessile, linear, leafy cotyledons, each about half an inch long. These cotyledons appear to be distinctly epigeal and (unlike what happens in *Ginkgo*), to disengage themselves speedily from the seed-coats as they do in *Pinus*; but on this latter point I have at present no direct evidence, nor as to their anatomical structure. Following the cotyledons, but separated from them and from one another by rather long internodes, are several primary leaves, flat, and in form like the cotyledons, but broader. Stomata are numerous on the under surface of these leaves. Although no opportunity has yet occurred to me of absolutely seeing the transition between these elongated primordial leaves and the short broad-shaped leaves which occur on the adult branches, there can I think be no reasonable doubt of their morphological identity and serial sequence as in *Pinus*.

Buds.—At the ends of the shoots of *Sciadopitys*, boat-shaped leaves, such as those just alluded to, occur crowded together in close spirals, without internodes, and in fact play the part of perulæ or bud-scales. In the axils of most of these may be seen, during the resting season, traces of the "needles," one to each scale. In the earliest stage in which I have yet seen them, these needles appear in the form of oblong flattened tubercles, with a notch at the apex, deeper in proportion at this stage than in the adult condition.

"*Needles*."—That the needles of *Sciadopitys*, although, as we have seen, they occupy the same axillary position as the fascicled leaves of *Pinus*, are not homologous with them, is shown by their anatomical structure† the liber elements (phloem) being on the upper, the woody elements (xylem) on the lower surface of the fibro-vascular bundles, the reverse of what happens in the fascicled needles of *Pinus*.

As to the real nature of these "needles" I do not at present intend to offer any statement, further than to confirm in general terms the anatomical structure, as revealed by Von Mohl, Bertrand, and Dickson,‡ and to allude to the curious

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* Bertrand, 'Anatomie comparée des tiges et des feuilles chez les Gnétacées et les Conifères,' Ann. Sc. Nat., 5 ser. Bot., tom. xx., p. 105, tab. 10, figs. 3 and 13.

† Bertrand, *l. c.* p. 105, tab. 10, figs. 4, 5; Von Mohl, Botan. Zeitung, 1871. Engelmann, Bot. Zeit., 1868, p. 484. Strasburger, Conif. und Gnetac., p. 382.

‡ Dickson, 'Proceedings International Botanical Congress,' London, 1866, p. 124; 'Gardeners' Chronicle,' July 28, 1883—(Abstract of Paper on *Ruscus*, &c., read before the Botanical Society of Edinburgh)—Carrière, 'Revue Horticole,' 1867 et Feb. 1884; Gard. Chron., March 1, 1884, p. 282; Masters, 'Vegetable Teratology,' p. 352, adnot. For the literature of the subject see Bertrand, *loc. cit.*, p. 104. Mr. Bower's views on the nature of this organ, communicated to the Linnean Society as this note was passing the press, will be shortly made public. A brief abstract will be found in Gard. Chron., March 15, 1884, p. 346.

branched condition they occasionally present. The "needle" divides at the apex more deeply than usual, and from the fork proceeds a little branch, bearing at its summit a whorl of "needles." (Fig. 1).

FIG. 1.—Branching "needle" of *Sciadopitys*, after Carriere

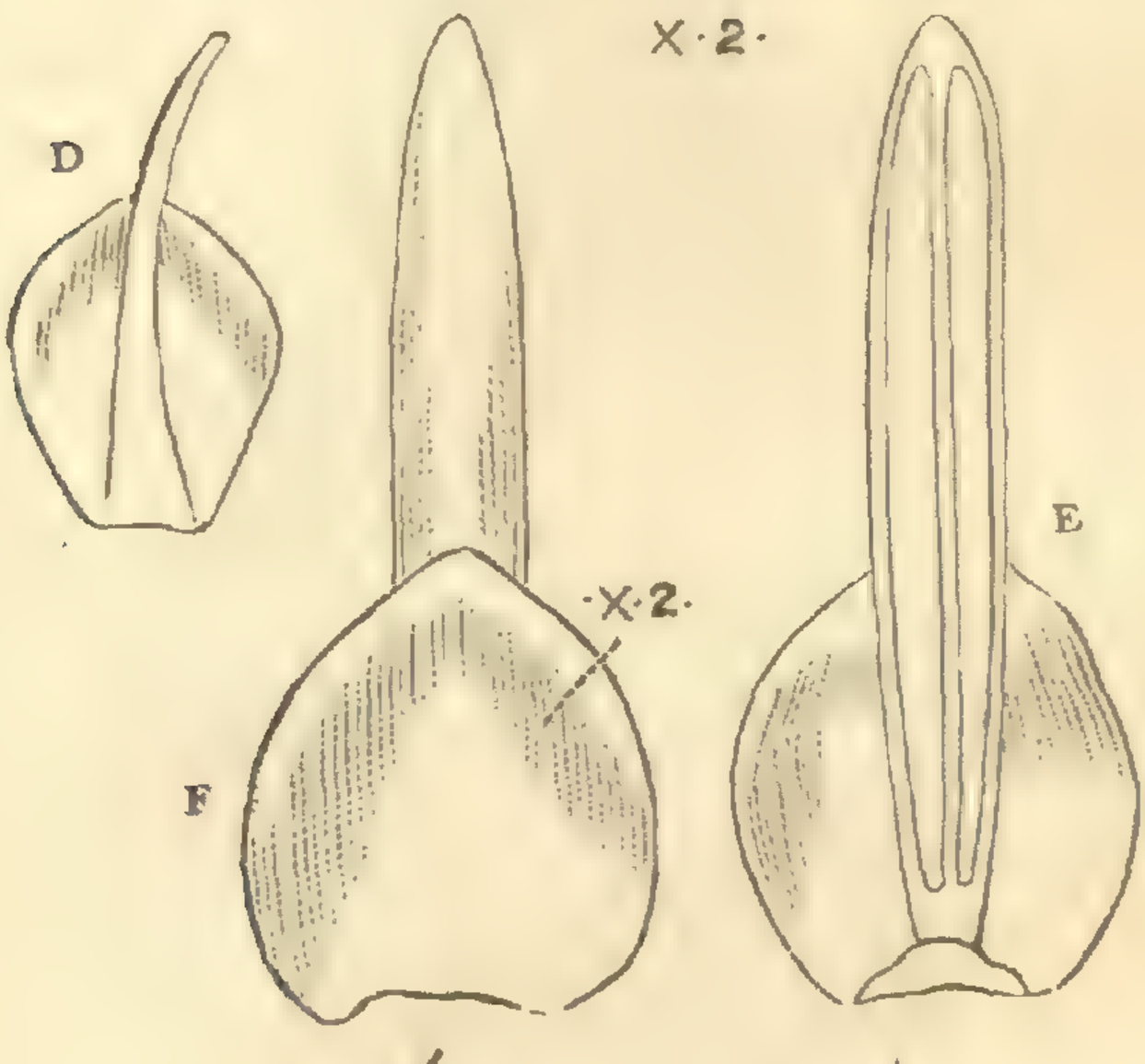

FIG. 2.—*Abies Douglasii*, portions of a prolified cone. A, three-lobed bract detached, and in the usual condition; B, section through bract and seed-scale, showing their concrescent, or inseparate condition at the base; C. bract and scale from below; D, bract reduced to a linear form; E, bract completely leafy, seen from the under surface; F, the same from the inner or upper side, showing the seed-scale (barren) enlarged 2 diam.

A more complete examination of similar specimens would obviously be desirable, but in the meantime, so far as they go, they lend little or no support to the notion that these organs are purely foliar, but they are not inconsistent with the views that the parts in question are of axial or of combined axial and foliar nature.

The Bracts and Seed-scale.—Coming now to the consideration of the cone of *Sciadopitys*, it may be stated that essentially it is of the same organisation as that of the *Abietineæ*. As I have had the opportunity recently, not only of examining adult dried cones, but recent ones, when not exceeding half an inch in length, and also proliferous cones such as represented in Veitch's 'Manual,' p. 201, it may be of some interest to record the principal points observed.

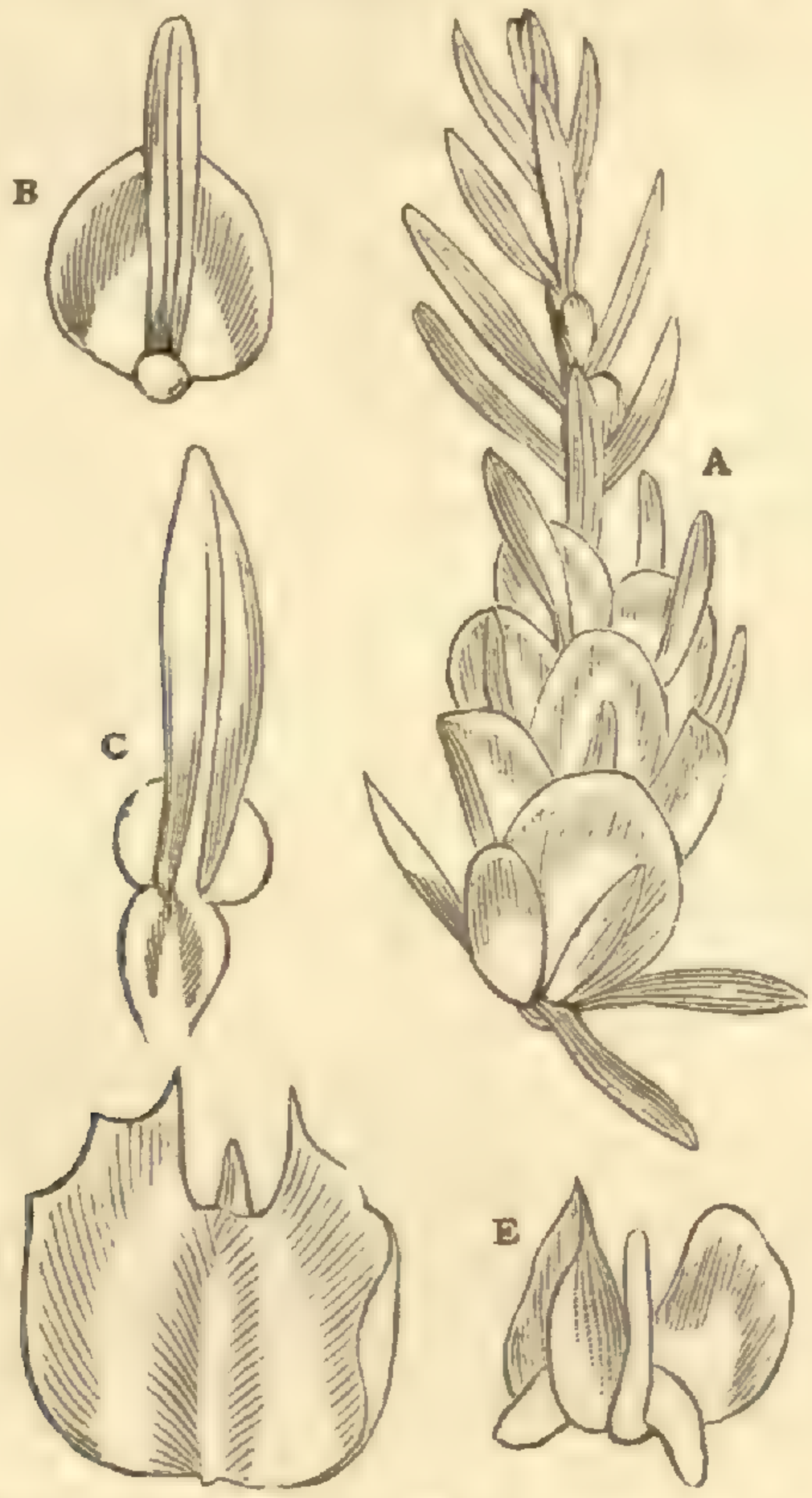

FIG. 3.—A, proliferous cone of Larch, *Larix europæa*; B, C, leafy bracts and scales from the same, showing the tendency for the bract to become leafy and for the seed-scale to disappear; D, E, outgrowths in the axils of leafy bracts of the upper part of the cone. The appearance presented by E with a central axis and two side appendages bearing rudimentary ovules? is suggestive as regards the theory of Braun and Caspary as to the nature of the seed-scale of *Abietineæ*.

The young cone of *Sciadopitys* is cylindric-oblong, obtuse at both ends. The lower bracts are deltoid-lanceolate, pinkish brown and membranous, and obviously serially continuous with the true leaves, whose position and structure have been above alluded to. The bracts increase in size from below upwards, more particularly in width, and their basal portion become considerably thickened. In passing upwards, the thickened portion of the bract increases in size, while the thinner membranous portion either shrivels up or falls away entirely. The lowermost bracts are empty, those

immediately above the base of the cone present about the middle of their inner surface a transverse line of white hairs, which, under the microscope, are seen to consist of oblong nucleated cells placed end to end in lineal series. Next in order, going from below upwards, are bracts having in their axils semi-lunar seed-scales, fleshy in texture, of a greyish green colour, and which emerge

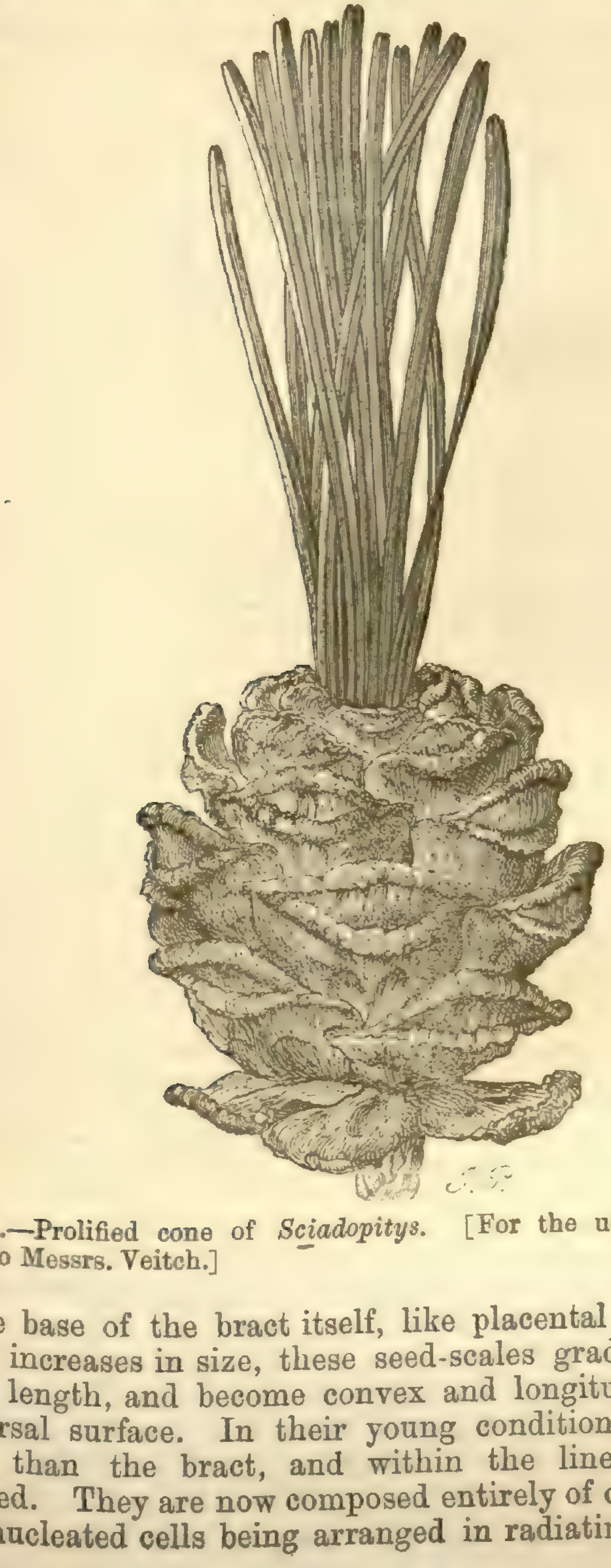

Fig. 4.—Prolified cone of *Sciadopitys*. [For the use of this cut I am indebted to Messrs. Veitch.]

from the base of the bract itself, like placental outgrowths. As the cone increases in size, these seed-scales gradually surpass the scale in length, and become convex and longitudinally fluted on their dorsal surface. In their young condition they are much smaller than the bract, and within the line of hairs above mentioned. They are now composed entirely of cellular tissue, the oblong nucleated cells being arranged in radiating lines from the

base. The cells at the base are relatively small, those towards the distal or free edge are larger and full of yellowish granular protoplasm. About the middle of the inner surface of the seed-scales next succeeding a transverse groove may be seen. On the scale next above this one, one ovule was visible; the succeeding three scales bore each three ovules, the next five, its successor seven.

The order and arrangement of the ovules were not exactly the same in all cases, but it seemed to be invariable, that if but one ovule were present that one was central in position, as if the formation were centrifugal.

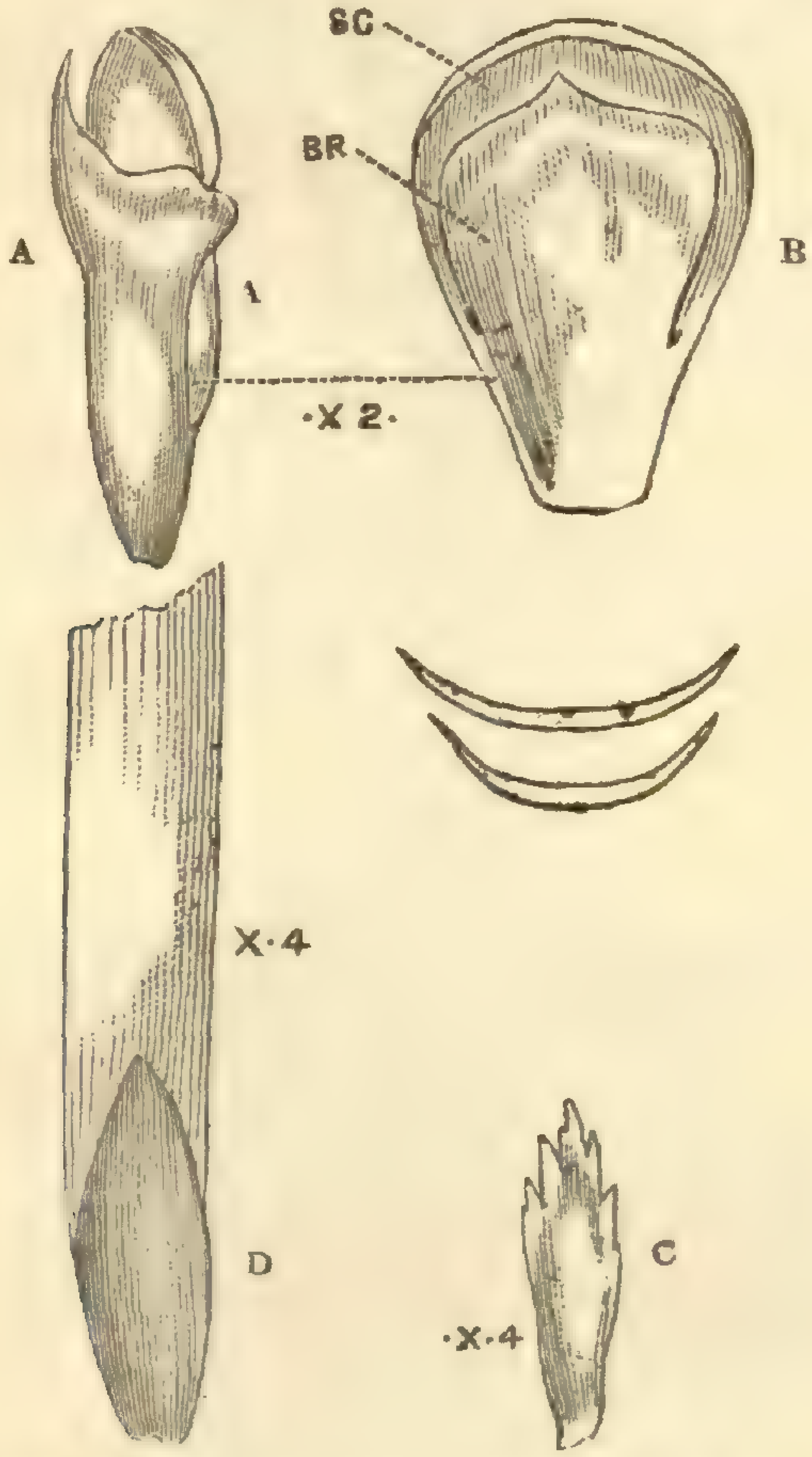

FIG. 5.—Bracts and scales from a cone similar to that represented at Fig. 4. A, bract and seed-scale from lower part of scone, seen from the side to the right is shown the same scale from without, BR = bract, SC = seed-scale: the sections beneath show the relative position of bract and scale above the point of separation; C, bract from the upper part of a proliferous cone; D, bract with portion of "needle" in its axil, enlarged 4 diam.

On making transverse and vertical sections of the base of the seed-scale at this stage, spiral vessels were seen, corresponding in number to the number of the ovules, no trace of such vessels being visible prior to the first appearance of the ovules, a fact, however, which is paralleled in many similar cases, and a circumstance to be borne in mind in gauging the value to be put upon the position and number of the vessels as indications of morphological organization. The vessels in question are clearly branches from those supplying the bract, as may be seen by making sections at

different levels from below upwards. In the upper seed-scales the phenomena are similar, but in inverse order; the seed-scale gradually disappears, and the number of the ovules is reduced from seven to five, three, and lastly to one only; that one occupies the centre, the vessels disappear, and the seed-scale becomes once more wholly cellular.

The cones mature in the second year after their formation, but as they are so well known, at least by figure and description, it is not necessary to say more than that their structure, in so far as regards the distribution of the liber and woody elements of their fibro-vascular bundles, is according to Eichler, and as I have myself observed, essentially, the same as in *Pinus*,* i.e. with the phloem above and the xylem below, the reverse of what is the case in the "needle" of *Pinus*, but agreeing in so far with the arrangement in the needle of *Sciadopitys*.

Scaleless Cones of Pinus muricata and of Cunninghamia.—It is interesting to compare with these young cones of *Sciadopitys* some immature or perhaps monstrous cones of *Pinus muricata*, which have also recently come under notice. In these the stalk was covered with spirally-arranged perular-leaves, which, as in other species of *Pinus* (and as we have shown to be the case in *Sciadopitys*), are serially continuous below with the primordial or true leaves, and above with the bracts of the cone. In the present case they pass gradually into thick spatulate bracts, terminating in a long acumen. In no case is any trace of seed visible.† Sections through their bracts show 5 or 7 fibro-vascular bundles, embedded in cellular tissue, and which may be traced down to the vascular cylinder traversing the axis of the cone.

It is also interesting to compare the appearances met with in a proliferous cone of *Cunninghamia sinensis* with those of *Sciadopitys*. In these cones the seed-scales were absent, but the bracts were thickened at the base, and from their inner surface projected one central, or two, or four reddish outgrowths, wholly cellular in structure. An examination of the bract revealed, going from without inwards,—1, an epidermis with tufts of simple hairs; 2, a single layer of hypoderm fibres; 3, a parenchyma of closely-packed ovoid cells, traversed by five resin canals each of which was surrounded by strengthening cells. Isolated strengthening cells of similar character were dispersed through the parenchyma. At the base two fibro-vascular bundles were seen (in all probability sub-divisions of one), and these had their xylem directed inwards towards the axis, the phloem outwards as in true leaves. In addition, there was a layer of transversely elongated cells, representing the transfusion tissue of Van Mohl. Lastly, the upper surface was covered with the usual epidermis.

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* Eichler, 'Ueber die Weiblichen Blüthen der Coniferen,' Monatsber. R Acad. Wissenschaft, Berlin, 1881, p. 1048, tab. 1, figs. 10, 11, 12, 13. See also Van Tieghem, 'Anatomie comparée de la fleur femelle, &c. des Coniferès,' Ann. Sc. Nat. 5 Serie, Bot. tom. x., p. 273, tab. 13 (figs. 18—21), *Pinus*, *Abies*, *Picea*, *Larix*, *Cedrus*.

† It is quite likely that in some species the seeds and seed-scales are not formed till long after the bracts. This is a point that requires investigation.

Proliferous Cones.—These have been so recently investigated by Eichler,* that it is not requisite here to enter into detail about these outgrowths. In general, the bracts in such cases become more or less leafy, that is, their always foliar character becomes enhanced, the seed-scale disappears, and in its place are found buds or leaf-bearing shoots. (Figs. 2, 3). Such conditions are very common in the larch and in *Cryptomeria japonica*, and I have met with it in species of *Tsuga* and in *Abies Douglasii*. Parlatore figures a fascicle of "needles" coming from the axil of the bract in *Pinus Lemoniana*. After what has been published, however, it is only necessary to allude to two instances of prolification which have not fallen under the observation of Professor Eichler. I allude to prolified cones of *Sciadopitys verticillata* and of *Cunninghamia sinensis* respectively.

Prolification of Cone of Sciadopitys.—The first intimation I had of such a production was derived from Veitch's 'Manual of the Coniferæ,' p. 202, wherein such a cone is figured from the collection of the late John Gould Veitch (Fig. 4), to whom we are indebted for the introduction to this country of so many interesting Japanese plants. A friend who has travelled in Japan tells me such cones are so frequent on native-grown trees that he looked on them as normal occurrences. Messrs. Veitch were so good as to allow me to examine one of these cones,† and quite lately I have had the opportunity of examining a similar one in a fresh condition, produced in France, and for an opportunity of examining which I am indebted to M. Carrière.

In the ordinary cone the bracts are inseparate from the seed-scale for nearly their whole length (fig. 5, A, B), but in Messrs. Veitch's specimen the bracts were gradually detached from the scale, the bracts themselves becoming not more and more leafy, as they usually do in proliferous cones, but more and more perular in character. From the axil of some of the uppermost of these perula-like bracts proceeded the long "needles" so characteristic of *Sciadopitys*. (Fig. 5, D). Hence the "needle" of *Sciadopitys* here occupied the corresponding position to that occupied by the bud-like formations in *Larix* and the fascicles of the leaves of *Pinus*, as figured by Parlatore. But, though occupying the same position, the elements of the fibro-vascular bundle are reversed.

Prolification in Cone of Cunninghamia sinensis.—Specimens of this were forwarded to me from Mr. A. D. Webster, and have already been alluded to, so far as regards the outgrowth from the inner surface of the bracts. The leaves of this tree are pseudo-distichous and spread horizontally; as they near the cone their size lessens, and they are seen to be arranged on all sides. These pass continuously and gradually into the bracts of the cone, which latter, as already mentioned, are much thickened at the base, and from them emanate the cellular outgrowths already referred to.

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* Eichler, 'Ueber Bildungsabweichungen bei Fichtenzapfen,' Sitzber. Kon. Acad. Wissenschaft, Berlin, 1882; Masters, in Gard. Chron., January 28, 1882, p. 112.

† 'Gardeners' Chronicle,' Jan. 28, 1882, p. 112.

I have now offered evidence in support of all the propositions with which I started at the outset, and it remains to be seen what inferences may be legitimately drawn from them. Among the most important facts elicited is the circumstance that identity of relative position is not, in all cases, to be taken as evidence of morphological homology; in other words, that "substitution," or "replacement without reference to origin, is not the same thing as "metamorphosis." The seed-scale of *Sciadopitys*, from what has been stated, can hardly be considered as the homologue of the "needle," as it has several vascular bundles instead of two only, and is an enation from the bract; neither can the seed-scale of *Pinus* be considered as the morphological equivalent of the fascicle of leaves of that plant; on the other hand, it does present considerable accord with the "needle" of *Sciadopitys*, differing chiefly in the greater number of the vascular bundles.

Lastly, as far as it goes, the evidence now brought forward seems to support the view of Eichler as to the nature of the seed-scale in *Abietineæ*. Eichler's views have the merit of simplicity, and do not involve so many assumptions and unproven statements as those of other morphologists do. What those views are is fully set forth in memoirs to which I have referred, but for the sake of conciseness I may here be allowed to quote from a letter received from the eminent morphologist and dated February 17, 1882:—"The seed-scale [of *Abietineæ*] is in my opinion only an excrescence from the outer scale [bract]; both together form but one single leaf." How well the facts already mentioned with reference to *Sciadopitys* fit in with this view needs no pointing out. Adverting more particularly to the prolified cones Eichler continues, "The result of my investigation is that the branches or buds in the axil of the seed-scales are not the transformed seed-scales, but altogether a new formation not existing in the normal cones. Nevertheless, the appearance of these buds brings about various changes in the seed-scale, such as folds, laciniæ, and similar irregularities, which frequently assume the aspect of real leaves."

The new formations then replace the seed-scale, but are not in this case, as they are in others, necessarily modifications of them. The proof of this is to be sought in the present instance in the frequent total absence of the seed-scale in these cases, and in the absence of any intermediate formation between the seed-scale and the abnormal production.

HUNTINGDON PLANTS & 'TOPOGRAPHICAL BOTANY.'

By Alfred Fryer.

In the following list of Huntingdonshire plants (which is supplementary to that given for the county in 'Topographical Botany'), two or three "introduced" plants are included; but these are only such as already are, or are likely to become, prominent members of the Huntingdon flora; or such as may

serve field botanists as indicative guides to further discoveries. I have to thank Mr. Arthur Bennett most warmly for assisting my slender botanical knowledge with his rich experience and valuable judgment, which have been most patiently and ungrudgingly given.

Ranunculus peltatus Fries, a. *truncatus*. Common in the fens.

Helleborus viridis L. Ellington Thorpe, where it was pointed out to me by Mr. John Linton.

Nymphæa alba L. The Ouse, and backwaters between St. Ives and Huntingdon.

Papaver dubium L. Both the vars. *Lamottei* and *Lecoqii* grow in Warboys Tick Fen.

Diplotaxis muralis DC. St. Ives; railway introduction.

Arenaria serpyllifolia L. Holme Fen.—b. *leptoclados*. St. Ives, Holywell. "As good *leptoclados* as I ever saw," *Rev. W. W. Newbould.*

Spergula arvensis L., b. *vulgaris*. Somersham, on "Old West River."

Polygala vulgaris L. Warboys Turf Fen. *P. depressa* Wender. Holme Fen. A distinct looking plant. Mr. A. Bennett, in refering it to this species, says, "it seems to answer to the var. *pyxophylla* Reich., a plant of the Tyrol and West Central France."

Trifolium filiforme L. Holme Fen.

Onobrychis sativa Lam. Warboys, clay soil near the wood, introduced.

Vicia angustifolia Roth, a. *segetalis*. Somersham.

Spiræa Filipendula L. Buckworth; Warboys, old pasture by Puttock's Lane,—to remove doubt. First record by the late Mr. W. O. Aitkin, of Somersham, a most excellent and trustworthy naturalist.

Rubus Lindleianus Lees. Holme Fen. Named by Prof. Babington.

Epilobium obscurum Schreb. Holme Fen.—*E. palustre* L. Holme Fen.

Callitriche obtusangula Le Gall. Warboys High Fen, Tick Fen; the commonest form in the fens.

Sedum acre L. Holme, by the railway,

Apium graveolens L. Ramsey Fen.

Artemisia Absinthium L. Warboys, on Puttock's Drove; in some years in vast quantities, making nearly £20 in a single season when sold to London herbalists. Native and widely spread over the fens.

Gnaphalium dioicum L. Holme Fen, where it was pointed out to me by the Rev. W. R. Linton. I have heard of another locality, but have seen no specimen.

Chlora perfoliata L. Woodwalton.

Limosella aquatica L. Earith (Journ. Bot. 1883, p. 377).

Thymus Chamædrys Fr. Abbots Ripton.

Calamintha Acinos Clairv. Holme Fen.

Salvia Verbenacea L. Holywell.

Marrubium vulgare L. Somersham, introduced.

Myosotis versicolor Curt. Trundle Hill, Pidley; hardly the typical plant.

Primula vulgaris Huds., b. *caulescens* and c. *intermedia*. Both at Warboys Wood.

Chenopodium ficifolium Sm. Warboys; Ramsey; on fen soil.—*C. hybridum* L. St. Ives.

Ceratophyllum submersum L. St. Ives (Journ. Bot. 1883, 375).

Quercus Robur L. The var. *pedunculata* is the only one I have seen in Hunts or Cambs.

Carpinus Betulus L. Warboys Wood.

Populus alba L. Warboys Broadpool; planted, but sometimes having the look of a native in the fens.

Salix fragilis L. Somersham; all willows, so frequently cultivated in the fens, must be recorded as doubtful natives, even when growing in such wild places as Holme Fen, as they are frequently inserted to mark the position of eel-traps, and so plants of them spring up in seemingly wild stations; seedlings, too, are not infrequent in damp places.—*S. Russelliana* Sm. Somersham; Warboys.—*S. alba* L. Somersham, &c.—*S. undulata* Ehrh. Warboys Turf Fen.—*S. triandra* L., d. *amygdalina*. Warboys, &c.—*S. Helix* Sm. Holywell, &c.—*S. viminalis* L. Warboys, &c.—*S. acuminata* Sm. Warboys Turf Fen.—*S. cinerea* Sm. Warboys Turf Fen, &c.; native.—*S. Caprea* L., *S. aurita* L., and *S. repens* L. Holme Fen; native.

Potamogeton natans L. St. Ives, and common in all highland ponds. — *P. Zizii* M. & K. Ramsey Fen (Journ. Bot. 1883, p. 316).—*P. decipiens* Nolte. Earith (Journ. Bot. 1883, p. 316).—*P. crispus* L., b. *serratus* Huds. Warboys Tick Fen, &c.; seems a good variety in the fens, not like the early state of the typical form. — *P. flabellatus* Bab. Earith, with well-developed lower leaves (Journ. Bot. 1883, p. 316).

Juncus acutiflorus Ehrh. Solom Lodge, Leighton. — *J. compressus* Jacq. Somersham; named by Mr. H. C. Watson. St. Ives; well-marked plants.

Scirpus acicularis L. Earith, by the Ouse.—*S. Tabernæmontani* Gmel. Warboys Broadpool.

Carex stricta Good. Warboys Turf Fen.—*C. præcox* L. Warboys, Ramsey. — *C. binervis* Sm. Warboys Turf Fen. Named by Prof. Babington. — *C. distans* L. Pidley; Stukely (Journ. Bot. 1883, p. 246).—*C. fulva?* Good. Requires confirmation by better specimens, which I could not get, as the station in Warboys Turf Fen was ploughed up.

Gastridium lendigerum Gaud. Monks Wood.

Agrostis canina L. Warboys Turf Fen; Holme Fen.

Lomaria Spicant Desv. Holme Fen, pointed out to me by the Rev. W. R. Linton.

Asplenium Ruta-muraria L. Warboys Church.

The Rev. W. R. Linton has kindly sent me an interesting list, with some specimens, of his discoveries in Hunts, but these I hope he will himself communicate to your pages. All the plants above named I have personally observed. Let me say I should be thankful to Huntingdonshire botanists for local lists, even of the commoner plants.

NOVAM *ECHINOCARPI* SPECIEM

TRADIT H. F. HANCE, Ph.D., CET.

Echinocarporum generis, a *Sloaneis* americanis (quibus ab illustri Lib. Bar. Ferdinando de Mueller revocatur *), levissimis tantum notis distincti, hodie decem innotuerunt species, quarum una solum in insula Java reperta est, quinque in Indiæ montibus oriuntur, reliquas quattuor parit feracissima Australiæ orientalis plaga. Hisce nunc addere juvat undecimam speciem, cujus unicum possideo exemplar fructiferum, in altioribus prov. Cantonensis jugis nuperrime detectam.

E. sinensis, sp. nov.—Arboreus, ramulis glaberrimis, foliis oblongis acuminatis basi cuneatis apicem versus leviter pauciserratis glaberrimis vix lucidis subtus reticulatis 4–5 poll. longis petiolo $1\frac{1}{4}$ pollicari, floribus . . . . ?, capsula globosa fulventi-tomentosa pollicem alta 5–6 loculari valvis maturitate stellatim patentibus basi solutis axeos apicem rotundatum nudantibus osseis 2 lin. crassis endocarpio purpureo-tincto plus minus solubili aculeis rigidis $3\frac{1}{2}$–5 lin. longis subulatis tuberculo parvo sæpius insidentibus aculeolis pilisve induratis antrorsis obsitis persistentibus, seminibus in loculis solitariis.

In jugo Lo-fau-shan, prov. Cantonensis, m. Sept. 1883, leg. rev. E. Faber. (Herb. propr. n. 22216). Proxime videtur affinis *E. Murici* Benth.

Ægerrime genus retineo; nam secundum amici de Mueller scrutinia,† in speciebus Australianis characteres quibus stirpes Asiaticæ a *Sloaneis* dignoscuntur ‡ prorsus evanescere videntur.

SISYRINCHIUM BERMUDIANA.

BY W. B. HEMSLEY, A.L.S.

ON first seeing the specimens of *Sisyrinchium* collected in the Bermudas, by Sir J. H. Lefroy and Mr. Moseley, I suspected that they were specifically different from the plant commonly known as *Sisyrinchium Bermudiana*, and after comparing them with numerous specimens of the plant so called from eastern North America, I was convinced that such was the case. Referring to the literature of the subject, I found this view supported by all the early writers who had actually seen the Bermudan plant. The history of the two species concerned is soon told. Towards the end of the seventeenth century Plukenet figured and briefly described what he termed the Bermudan and the Virginian *Sisyrinchii*, the types of which are still preserved in the Sloane Herbarium at the British Museum. Dillenius, who had oppor-

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* Fragm. phytogr. Austral. iv. 92.

† Ejusd. op. v. 28, vi. 170.

‡ Benth. in Proc. Linn. Soc. v. suppl., 2, 71; Bocquillon in Adansonia, vii. 49.

tunities of seeing living plants at Eltham, followed Plukenet in distinguishing these two species, and published better figures and more complete descriptions of them in the 'Hortus Elthamensis.' Linnæus, who we assume did not see the Bermudan plant, as there is no specimen in his herbarium, united the two, as varieties of one, under the name of *S. Bermudiana*. Miller, who seems to have been the most accomplished English botanist of his day, was the first to restore the two forms to specific rank. This was in 1771. In 1789 Curtis figured the true Bermudan plant and insisted upon its specific rank, remarking that he had living plants before him of both of the species figured by Dillenius. Unfortunately he gave it a new specific name, for which he afterwards expressed his regret. The first DeCandolle wrote the text to the excellent figure of the Bermudan plant, which was published in Redouté's 'Liliacées,' at the beginning of the present century, and he particularly points out its distinctive characters. I have not taken the trouble to turn up every book in which the two species are likely to be mentioned, and I have not ascertained who was the first botanist to reunite them; but the North American botanists seem to be agreed that there is only one species of *Sisyrinchium* in the eastern States, and this they designate *S. Bermudiana*. The error probably arose in consequence of the Bermudan plant disappearing from European gardens, though the name was retained. *S. Bermudiana* requires the shelter of a greenhouse in this country, not merely to protect it from frost, but also to enable it to attain its full development, while *S. angustifolium*, the other species, is perfectly hardy and grows like grass. Curtis, having been deceived by its behaviour during a very mild winter, at first stated that the Bermudan plant was hardy, an assertion that he recalled in the letterpress accompanying the figure cited below of his *S. gramineum*.

The synonymy of the Bermudan plant follows:—

SISYRINCHIUM BERMUDIANA Linn. Sp. Pl., ed.l. p. 954 (quoad β. tantum); Miller, Dict., ed. 6; Lamarck Encycl. Method. Bot. i., p. 408; Redouté, Lil. t. 149.

Sisynrichium *Bermudense* floribus parvis, ex cæruleo & aureo mixtis; Iris Phalangoides quorundam; Plukenet, Almagestum, p. 348, et Phytogr., t. 61, fig. 2,

Bermudiana Iridis folio, fibrosâ radice, Tournefort, Inst. Rei Herb., p. 388, t. 108; Dillenius, Hort. Elth., p. 48, t. 41, fig. 48.

Sisyrinchium iridioides Curtis, Bot. Mag., t. 94.

Sisyrinchium Bermudianum, var. 1, Baker in Journ. Linn. Soc. Lond., xvi., p. 117.

Endemic in the Bermudas.

Besides the Bermudan specimens alluded to above, there are cultivated specimens at Kew from the herbarium of Bishop Goodenough, presented by the Corporation of Carlisle.

Sisyrinchium Bermudiana differs from *S. angustifolium* in being much larger in all its parts, and strikingly so in its broad leaves, which are equitant at the base; hence Curtis's name *iridioides*. It grows eighteen to twenty-four inches high, and is stout in pro-

portion. The flowers are large, and the broad segments of the perianth are obovate-mucronate; but I have not been able to compare the flowers, as there are none of the Bermudan species in a satisfactory state. However, a comparison of the figures cited should be sufficient to convince anyone of their specific diversity.

With regard to the forms of *Sisyrinchium* from eastern North America, if they are all to be regarded as belonging to one species, and we have the authority of the leading botanists in the States for considering them as such, Miller's name, being the earliest, is the one to adopt.

Sisyrinchium angustifolium Miller, Dict., ed. 6 (1771).

Sisyrinchium anceps Cavanilles, Dissert. vi., p. 345, t. 190, fig. 2 (1788).

Sisyrinchium gramineum Curtis, Bot. Mag., t. 464 (1799).

Sisyrinchium mucronatum Michaux, Fl. Bor.-Am. ii., p. 33 (1803).

Sisyrinchium Bermudiana Linn., Sp. Pl., ed. i., p. 954, excl. *β. Bermudense*.

Sisyrinchium Bermudiana, A. Gray Man. Bot. Northern U.S., ed. 5, p. 517; Chapman, Fl. Southern U.S., p. 474; Baker in Journ. Linn. Soc. Lond., xvi., p. 117, excl. var. 1.

Sisynrichium cæruleum parvum, gladiato caule *Virginianum*: Plukenet, Almagestum, p. 348, et Phytogr., t. 61, fig. 1.

Bermudiana graminea, flore minore cæruleo: Dillenius, Hort. Elth., p. 49, t. 41, fig. 49.

Common in the eastern States of North America, from Massachusetts to Florida, and naturalized in the Mauritius, New Zealand, and Australia. It also occurs in Ireland, where it is reported to be spreading; and as it so readily colonizes, it has been considered as an introduced plant, though, on the other hand, the North American *Eriocaulon septangulare* is generally admitted to be indigenous in Ireland.*

A SYNOPSIS OF THE GENUS *SELAGINELLA*.

By J. G. Baker, F.R.S., &c.

(Continued from p. 90.)

126. **S. Cunninghami,** n. sp.—Stems trailing, 3–6 in. long, copiously pinnate, the lower branches considerably compound. Leaves of the lower plane contiguous and ascending on the branchlets, rather spaced and spreading on the stem, oblique ovate or oblong, subacute, ½–¾ lin. long, bright green, membranous, very unequal-sided, very cordate and shortly ciliated on the upper side at the base and much imbricated over the stem; leaves of the

* Since the above has been in type, Dr. Asa Gray has directed my attention to the fact that Mr. Sereno Watson pointed out, as long ago as 1877 (Proc. Am. Acad. Sc., xii., p. 277), that the Bermudan *Sisyrinchium* was a distinct species; but as he has neither elaborated the synonymy of the species, nor explained that the Linnean *S. Bermudiana* was a composite one, he has only so far anticipated me that he recognized the Bermudan plant as different from the North American.—W. B. H.

upper plane half as long, oblique ovate, with a distinct cusp. Spikes copious, ¼–¾ in. long, ½ lin. diam.; bracts ovate-lanceolate, crowded, strongly keeled.

Hab. Rio Janeiro, *Prof. Cunningham* ! *Glaziou* 5217 ! 7039 !

127. **S. rhodospora,** n. sp. — Stems very slender, entirely trailing, copiously pinnate, the lower branches compound. Leaves of the lower plane spaced, spreading, oblong, acute, ½ lin. long, bright green, membranous, nearly equilateral, conspicuously ciliated on both edges, cordate on the upper side at the base, and imbricated over the stem; leaves of the upper plane half as long, oblique ovate, with a large cusp. Spikes short, copious, ½ lin. diam.; bracts ovate cuspidate, crowded, strongly keeled in the upper half.

Hab. Eastern Cuba, *Wright* 1824 !

128. S. Moritziana Spring Mon. ii. 249.—Stems trailing, intermatted, ½–1 ft. long, flat on the back, flat or sulcate on the face, copiously pinnate, the lower branches often considerably compound. Leaves of the lower plane spaced and spreading even on the branches, oblique ovate, acute, a line long, bright green, firmer in texture than in *apus* and *brasiliensis*, unequal-sided, more produced on the upper side of the midrib, slightly cordate and shortly ciliated on the upper side at the base, and a little imbricated over the stem; leaves of the upper plane half as long, oblique ovate, acute. Spikes short, 1 lin. diam.; bracts uniform or slightly dimorphic, ovate-lanceolate, strongly keeled.

Hab. Andes of Venezuela, New Granada, and Ecuador, ascending to 10,000 feet. A near ally of *S. apus* and *brasiliensis*. In Crypt. Nov. Gran. p. 367, A. Braun defines six varieties. *S. porphyrospora* A. Br. Crypt. Nov. Gran. 369, gathered in Mexico by Sartorius, differs from *Moritziana* by having branches with excurrent whip-like ends, like those of *flagellata* and *cladorhizans*.

129. S. brasiliensis A. Br. in Crypt. Nov. Gran. 374; *S. crassinervia*, *polysperma*, and *apus*, ex parte, Spring; *S. apus* Fée Fil. Bras. Suppl. 98; *S. Beyrichii* A. Br.; *Lycopodium brasiliense* Raddi Fil. Bras. 82, tab. 1, fig. 4; *L. patulum* Gaudich, non Sw.—Stems trailing, 2–4 in. long, copiously pinnate, the branches erecto-patent, the upper simple, the lower slightly compound. Leaves of the lower plane spaced and spreading, except towards the tip of the branches, oblique oblong, acute, ¾–1 lin. long, bright green, membranous, more produced on the upper side of the midrib, cordate at the base on the upper side, distinctly ciliated and imbricated over the stem; leaves of the upper plane half as long, oblique oblong, with a distinct cusp. Spikes ¼–½ in. long, 1 lin. diam.; bracts ovate-lanceolate, strongly keeled in the upper half.

Hab. Common in the southern half of Brazil, from Bahia and Minas Geraes to Santa Catherina. A near ally of *S. apus*. *S. polysperma* Spring is a form with short stems and copious long spikes. *S. anocardia* A. Br. in Fil. Nov. Gran. 374, is said to differ from *brasiliensis* by its more remote, more obtuse leaves of the lower plane; leaves of the upper plane with a shorter cusp and anticous bracts not so acuminate, and furnished with a broad keel, which is strongly toothed in the upper part.

130. S. LUDOVICIANA A. Br. in Ann. Sc. Nat., 4 ser., xiii. 58; *S. apus* var. *denticulata* Spring Mon. ii. 77. — Stems slender, copiously pinnate, flat on both back and face, reaching a length of half a foot, the upper branches simple, the lower slightly compound. Leaves of the lower plane much spaced below the tip of the branches, spreading, ovate-oblong, subacute, firmer in texture than in *apus*, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, serrulate, not distinctly ciliated, more produced on the upper side of the midrib, broadly rounded at the base, and imbricated over the stem; leaves of the upper plane half as long, oblique oblong, cuspidate. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, 1 lin. diam.; bracts ovate-lanceolate, a line long, strongly keeled.

Hab. Alabama and Louisiana, *Drummond* 485. A near ally of *S. apus*. Well known in cultivation.

131. S. BINERVIS Liebm.; *S. sarmentosa* Liebm., non A. Br.; *S. Moritziana* Fourn. Crypt. Mex. 148, vix Spring.—Stems trailing, 2–4 in. long, copiously pinnate, the short erecto-patent branches mostly simple. Upper leaves of the lower plane close, erecto-patent; lower spaced, spreading, ovate, acute, at most a line long, firm in texture for this group, more produced on the upper side of the midrib, spuriously 2-nerved, very cordate, shortly ciliated, and much imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, oblique ovate, with a long cusp. Spikes short, under 1 lin. diam.; bracts ovate-lanceolate, strongly keeled.

Hab. Mexico, *Liebmann*! A near ally of *S. Moritziana*, with which Fournier unites it.

132. S. MUSCOSA Spring. Mon. ii. 100.—Stems slender, flaccid, twisted, trailing, tufted, 3–4 in. long, copiously pinnate, the lower branches sparingly compound. Leaves of the lower plane spaced, ovate, subobtuse, a line long, unequally spreading, sometimes inflexed or reflexed, subcordate on both sides at the base, more produced on the upper, minutely ciliated, and imbricated over the stem; leaves of the upper plane scarcely smaller, curved, convergent, aristate. Spikes short, square; bracts ovate-acuminate, strongly keeled.

Hab. Damp woods at Rio Janeiro, *Luschnath*.

133. S. APUS Spring Mon. ii. 75, ex parte; *S. albidula* Spring Mon. ii. 95; *Lycopodium apodum* Linn.!; *L. albidulum* Sw.—Stems slender, trailing, densely matted, 1–4 in. long, angled on the face, the short distant erecto-patent branches simple or forked. Leaves of the lower plane spaced below the tip of the branches, the upper spreading, the lower reflexed, ovate, acute, $\frac{1}{2}$ lin. long, pale green, membranous, unequal-sided, more produced on the upper side of the midrib, serrulate, not distinctly ciliated, cordate on the upper side at the base, and a little imbricated over the stem; leaves of the upper plane half as long, ovate, shortly cuspidate. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, 1-12th to 1-8th in. diam.; bracts ovate, acute, membranous, about a line long, strongly serrulate, acutely keeled in the upper half.

Hab. Canada, and through the United States to Texas. Common in cultivation. Interesting geographically as a representative in the temperate zone of a characteristically tropical group.

134. **S. prasina,** n. sp. — Stems slender, square, trailing, intermatted, 1–2 in. long, flat on the face, with a few short spreading simple branches. Leaves of the lower plane, the upper contiguous and ascending, the lower spreading and spaced, ovate, obtuse or subacute, $\frac{1}{3}$ lin. long, bright green, membranous, unequal-sided, more produced on the upper side of the midrib, broadly rounded on the upper side at the base, obscurely ciliated, and a little imbricated over the stem; leaves of the upper plane half as long, ovate or oblong, acute, not cuspidate. Spikes short, copious, $\frac{1}{2}$ lin. diam.; bracts suborbicular, cuspidate, membranous, strongly keeled in the upper half.

Hab. Eastern Cuba, *C. Wright* 1825! 1825 b!

135. **S. conferta,** n. sp. — Stems very slender, trailing, intermatted, 1–2 in. long, copiously pinnate, the lower branches slightly compound. Leaves of the lower plane close, erecto-patent, linear-oblong, obtuse, $\frac{1}{2}$ line long, bright green, membranous, equal-sided, rounded, strongly ciliated, and a little imbricated over the stem at the base; leaves of the upper plane one-third to one-fourth as long, oblique oblong, acute. Spikes very short, $\frac{1}{2}$ lin. diam.; bracts ovate, crowded, strongly keeled.

Hab. Cuba, *Wright* 3909! A near ally of *S. albonitens.*

136. S. ALBONITENS Spring Mon.i i. 80; *S. mollis* L'Herminier, Fée Fil. Ant. tab. 34, fig. 1. — Stems slender, trailing, copiously pinnate, the upper branches simple, the lower slightly compound. Leaves of the lower plane spaced on the main stem, spreading, oblong-lanceolate, a line long, subacute, membranous, bright green, rather unequal-sided, rounded on the upper side at the base, shortly ciliated, and slightly imbricated over the stem; leaves of the upper plane one-third as long, oblique ovate, with a distinct cusp. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{1}{2}$ lin. diam.; bracts ovate, acute, very crowded, strongly keeled.

Hab. West Indies; Cuba (*Wright* 940!); Jamaica, Guadeloupe, Porto Rico, South Brazil, *Tweedie*!

137. S. CLADORHIZANS A. Br. in Crypt. Nov. Gran. 366.—Stems very weak, trailing, 2–3 in. long, copiously pinnate, the upper branches simple, the lower slightly compound, excurrent and whip-like at the top, with rudimentary leaves. Leaves of the lower plane spaced below the tip of the branches, spreading, oblong-lanceolate, subacute, a line long, pale green, membranous, nearly equilateral, rounded on both sides at the base, the upper shortly ciliated, and slightly imbricated over the stem; leaves of the upper plane one-third as long, obovate, distinctly cuspidate. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, under 1 lin. diam.; bracts ovate-lanceolate, crowded, strongly keeled.

Hab. Venezuela, at Tovar, *Fendler* 324! Limestone rocks at Trovadore, on the Rio Tapajoz, *Trail* 1436! A near ally of *S. albonitens.*

(To be continued.)

FRANCIS MASSON.

By James Britten, F.L.S.

An enquiry by Mr. N. E. Brown as to the whereabouts of certain drawings sent by Francis Masson to Sir Joseph Banks, has induced me to carry out an intention, formed some time since, of publishing a fuller account of this early collector in South Africa than has hitherto appeared. Notices of him will be found in Lasègue's 'Musée Botanique de M. Delessert' (pp. 178, 179); in 'Rees' Cyclopædia,' the best published summary of his work; in the 'Annals of Botany,' ii., 592; and in the 'Gardeners' Chronicle,' N.S., xvi., 335. To the particulars given in these books I have been enabled to add considerably from various sources, especially from the (unpublished) correspondence of Sir Joseph Banks. The fact that the greater part of Masson's collections is in the British Museum, and that these have been practically ignored by writers upon South African botany, seems to me to afford an additional reason for drawing attention to the man and his work. The zeal and energy of the former and the value of the latter are so manifest that it is unnecessary to draw attention to them.

Francis Masson was born at Aberdeen in August, 1741, became a gardener, made his way to London, and entered the Royal Gardens at Kew as under-gardener, William Aiton being then at the head of that establishment. In 1772, Sir Joseph Banks, in consequence of observations made when he had landed at the Cape the previous year, "suggested to his Majesty the idea of sending a person, professionally a gardener, to the Cape, to collect seeds and plants for the Royal Botanic Gardens at Kew. His Majesty was graciously pleased to adopt the plan, though," says Masson, from the preface to whose 'Stapeliæ Novæ' we are quoting, "at that time so little approved by the public, that no one but myself chose to undertake the execution of it. I sailed for the Cape in the beginning of 1772, and remained there two years and a-half." During this time he undertook three journeys into the interior, of which, on his return to England, he published an account in the 'Philosophical Transactions,' vol. lxvi., pp. 268–317. On his first journey (Dec. 10, 1772—Jan. 18, 1773), he says he was "attended by a Dutchman." This was Oldenburg, as we learn from Thunberg (Fl. Capensis, p. 6), who, speaking of Masson, says "Anno 1772 brevius cum D. Oldenburg iter instituit."* The

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* Oldenburg's plants—about 1000 in number—are in the British Museum Herbarium, having been acquired by Sir Joseph Banks; a MS. note by Mr. Brown states shat he was a private soldier. It may be worth while appending Thunberg's account of him—all that is known, I believe. "Oldenburgh, Svecus, a memet incitatus et eruditus, in campis Urbem circumjacentibus comes sæpe meus indefessus Anno 1772 fuit, et eodem anno iter cum D. Masson instituens, plantarum copiam collegit. Anno 1774 insulam Madagascar adiit, ubi febri maligna correptus diem obiit supremum."—Fl. Cap. 6, 7.

"second journey (Sept. 11, 1773—Jan. 29, 1774) was performed in company with Dr. Thunberg"; and on the third also (Sept. 26—Dec. 28, 1774), he seems to have been accompanied by Thunberg, as, although he does not mention this in his account, he writes to Linnæus that he "made two successful journeys with the ingenious Dr. Thunberg,"* and the latter (Fl. Capensis, p. 6) says of Masson "Annis 1773 et 1774 mecum interiora Africes versus orientem et septentrionem peragravit." The last year is that usually given by Aiton in the 'Hortus Kewensis' for the introduction of Masson's plants, and it is also the year in which most of his specimens in Herb. Brit. Mus. were collected. Writing to Linnæus, he speaks of having "added upwards of 400 new species to his Majesty's collection of living plants, and I believe many new genera."*

On the 19th of May, 1776, Masson again left England. Of his work during the next few years, I am fortunate in having found a full account in the Banksian correspondence; and, as this has never been published, I think it best to print it entire. As will be seen, it is in the form of a memorandum (which is not dated), addressed to the King by Sir Joseph Banks, in his capacity as President of the Royal Society.

In the year 1772 Sr. John Pringle, late President of the royal Society, made application to his Majesty that Mr. Masson, then one of the under Gardiners at Kew, might be appointed to reside for some time at the Cape of Good Hope, in order to collect there Seeds & living plants, for the Royal Botanical Garden at Kew.

His Majesty being graciously pleased to honor this plan with his royal approbation, & to signify to Sr. John Pringle that Mr. Masson would be allow'd his expences, provided they did not exceed £200 a year, & a recompence on his return of £100 a year, Mr. Masson sail'd for that place, & was absent from England about 3 years.

In the course of his absence he drew bills on Messrs. Thos. Coutts & Co. to the amount, as appears by their books, of £583 8s. 6d. for his support & expences; & soon after his return his Majesty was pleased to order the sum of £300 to be paid to him, which money Mr. Aiton, his Majesties Botanical Gardiner, received from the hands of Mr. Ramus, deceas'd, late his Majesties first page, & paid to Mr. Masson, who gave a receipt for it as having recd. it from Mr. Ramus.

In the course of this Voyage Mr. Masson collected & sent home a profusion of Plants, unknown till that time to the Botanical Gardens in Europe, a full account of which will appear in Mr. Aiton's Catalogue of the Plants in the Royal Botanick Garden at Kew, which is nearly ready for publication; by means of these, Kew Garden has in great measure attained to that acknowleg'd superiority which it now holds over every similar Establishment in Europe; some of which, as Trianon, Paris, Upsala, &c., till lately vyed with each other for preeminence, without admitting even a competition from any English Garden.

Mr. Masson, having by these means ingratiated himself with all those who make natural history their study or amusement, & produced an account of his voyage into the inland of Africa, which was printed in the Philosophical transactions, express'd the most ardent desire of being again employ'd in the like researches. Accordingly Sr. John Pringle again petition'd his Majesty in the year 1776, who was graciously pleas'd to consent to Mr. Masson's again undertaking an extensive Plan of operations; he was to visit *Madeira*,* the *Canaries*, the *Azores*, and by the way of the *West Indian Islands*, to penetrate, if possible, to the *Spanish Main*.

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* Smith's 'Correspondence of Linnæus,' ii., 559.

This he undertook, & succeeded, at least as fully as before, in sending home from Madeira, Teneriff, & the Western Islands, in a manner, the whole of their produce, the greatest part of which prov'd new to European botanists.

Ample mention is madé of these Plants, dried specimens of which he communicated to the late Professor Linnæus, in a work published by his Son, intitled ['Supplementum Plantarum.'].

When Mr. Masson arriv'd in the West Indian Islands, the war, then somewhat advanced, made it necessary for him intirely to drop his plan of visiting the Spanish Main, to which it was in vain for him to apply for a pasport. The Islands themselves he found in so unsettled a state that it was with the utmost difficulty he found means to send home what he collected, parts of which were frequently lost by capture or waiting for Convoy.

When the French attack'd Granada he was call'd upon to bear arms in its defence, which he did, & was taken prisoner fighting in the trenches.

He was also in the terrible hurricane of Octr. 14, 1780, at St. Lucie, and lost there all the Collections at that time in his possession, & great part of his Clothes and Papers.

Finding by fatal experience that in time of war the purposes of his Mission could not effectually be fulfilled, he came to the resolution of returning, which he did in November of last year.

I shall take up his expences of his last voyage upon the same plan as they were settled by Sr. John Pringle for his voyage to the Cape.

Account of Expences and Salary from April, 1776, to April, 1782.

Bills drawn by him for his Expences during the voyage, by Mr. Coutts books	1166	4	6
Salary from April, 1776, being six years	600	0	0
His Majesty was pleased to give him a Bank note in advance at his departure, which deduct..	50	0	0
Remains due on acct. of Salary	550	0	0

Of which £193 5s. 0d. was expended in Passages, as appears by a list annexed.

Having thus brought Mr. Masson home from ten years employment in Collecting plants for the Royal Botanick Garden at Kew, I cannot omit saying that during that time he has prov'd himself sufficiently instructed in the Science of Botany for the purposes of his Mission, & indefatigable in the execution of his duty.

I am confident that the famous Journey to the Levant, made by Monsr. Tournefort by the order of Lewis XIV. at an immense expence, did not produce so great an addition of Plants to the Paris Gardens as Mr. Masson's Voyage to the Cape only has done to that of Kew.

As far as I am able to judge, his Majesties appointment of Mr. Masson is to be accounted among the few Royal bounties which have not been in any degree misapplied.

At present the War in Europe making it necessary for Ships from all parts of his Majesties dominions to come home in Convoy, almost precludes the Idea of Mr. Masson being employed with success in any part of the world.

Should his Majesty be graciously pleas'd to consider his past services, & those he is likely to perform when a peace shall arrive, to appoint such part of his salary as to his Royal wisdom shall seem meet for his present sustenance, & that he having by ten years absence from the improvements of his Profession, & by being during all that time admitted to the Society of Men of Education, as well as circumstances much superior to his own in great measure incapacitated from following it.

Should his Majesty, I say, be graciously pleas'd to appoint him a part of his Salary for his present sustenance, annexing him in this manner to the service of the Royal Botanick Garden, and to order him out again as soon as those concern'd in the management of it can find a proper opportunity, I am confident that such his royal bounty would conciliate the gratitude of all who make the

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* On this voyage or on his return he collected at St. Helena, but his specimens have no date attached to them.

Science of nature their study throughout Europe, & more especially those who in this Kingdom, I may say under his Majesties particular Auspices and protection, follow that most engaging occupation of glorifying the Creator by observing and pointing out the wonders of his works.

J. BANKS.

Expences on a Voyage through the Madeira, Canary, Azores, and West Indian Islands, by order of his Majesty.

	£	s.	d.
From the 5th June, 1776, to May 31st, 1777	242	15	3
In the Azores.			
From 31st of May, 1777, to Jany. 1st, 1778	114	11	6
In the Canaries.			
From Jany. 1st, 1778, to 4 October, 1778	110	0	0
On my return to Madeira.			
From October, 1778, to May, 1779, including my passage to the Wt. Indies, amounting to 30 Guineas	118	15	6
	656	2	3
Expended on my own account	55	18	0
	600	4	3

In the Wt. Indies.

August, 1779, at Grenada, a bill of £75	75	0	0
Novr., 1779, at Antigua, a bill of	30	0	0
„ 1780, at St. Eustachia, St. Christopher, and Nevis, Bills amounting to	130	0	0
October, 1780, at St. Lucie, do.	40	0	0
March, 1781, at Jamaica, do.	70	0	0
On leaving Jamaica, do.	106	0	0
Passage home	40	0	0
	591	0	0
Expended at Jamaica on my own account	50	0	0
	541	0	0

Salary from April, 1776, to April, 1782, at £100 p. Ann.	600	0	0
Received from his Majesty at my departure from England £50 0 0			
For my own use at Madeira 55 15 0	155	15	0
„ Jamaica 50 0 0			
Remains due	444	5	0

Money expended on Passages.

	£	s.	d.
From England to Madeira	15	15	0
From Madeira to Azores	10	0	0
Among the Azores	30	0	0
From Madeira to Theneriff	4	0	0
From Theneriff back to Madeira	30	0	0
From Madeira to Barbadoes	31	10	0
From Barbadoes to Grenada	3	0	0
From Grenada to St. Eustatia	4	0	0
From St. Eustatia to Antigua	3	0	0
From Antigua to St. Christopher	3	0	0
From St. Christopher to St. Lucia	6	0	0
From St. Lucia to Nevis	3	0	0
From Nevis to Jamaica	10	0	0
From Jamaica to England	40	0	0
	193	5	0

Banks was successful in his application, as the following note (which succeeds the memorandum in the Banksian correspondence) shows :—

To
Lord Brudenell.

Soho Square,
Novr. 29, 82.

My Lord,

Mr. Masson, whom his Majesties Bounty through your Lordships mediation has rendered effectually happy, having received an invitation from a gentleman at Lisbon * possessed of an ample Botanick Garden to assist in arranging & naming his plants, & being unwilling to remain idle Masson went to Portugal in 1783, while by prosecuting that business he may have an opportunity of enriching his Majesties botanick garden by exchanges from thence, Humbly requests his Majesties permission to undertake the Voyage, on Condition, that, if during his absence which he at present intends to continue only a few months, his Majesty should have occasion for his services in any other line, he will, on receiving notice thereoff, instantly return to such place as his Majesties orders shall direct.

J. BANKS.

During Masson's stay in the Azores he forwarded plants and specimens to Aiton, and an account of the Island of San Miguel, which is published in Phil. Trans., lxviii., 601–610. He also sent specimens to the younger Linnæus, who acknowledges his indebtedness to Masson for all the Canarian plants described in "Supplementum Plantarum.† These included *Musschia aurea*, *Convolvulus floridus*, *C. scoparius*, *Echium candicans*, *E. giganteum*, *E. strictum*, *Senecio echinatus*, *Cytisus proliferus*, *Carlina xeranthemoides*, and other striking and characteristic species.‡

Besides the two letters from Madeira published in the Linnean correspondence, there are three in the Banksian correspondence, dated respectively Feb. 4, May 27, and Dec. 12, 1777. We have also in the Department of Botany a list of the plants sent home by Masson in July, 1776. They contain nothing of importance, except some of the details as to his movements, which have been already

* This was no doubt the merchant with whom Masson had corresponded while in Madeira, and to whom he refers ('Correspondence of Linnæus,' ii. 564) as "Mr. De Visme, a merchant in Lisbon, who has a fine botanic garden, and is an enthusiastic lover of plants." He is commemorated by the genus *Vismia*.

† *Massonia*, Thunb. . . . . In memoriam Francisci Masson, Peregrinatoribus Botanici in America celeberrimi, cui omnia Canariensia in hoc opuscula debeo," *op. cit.*, p. 27. Although Thunberg is here quoted as the authority for the genus, this is its first publication. Thunberg had no doubt named the plant in MS.; Masson, in forwarding it to Linnæus in 1775, remarks that "Mr. Thunberg had a great desire of giving [it] the name of *Massonia*, ... but . . . . . I have declined receiving that honour from any other authority than the great Linnæus." —Smith, 'Correspondence of Linnæus,' ii. 560.

‡ Among these is a plant named by Linn. fil. *Gentiana scilloides*, referred to *Erythræa* (*Gentiana*) *maritima* by Aiton (Hort. Kew. i. 323) of which we do not possess Masson's specimens; Smith (Fl. Græca, iii. 32) pointed out that this was not identical with *G. maritima* L., and Sweet (Hortus Britannicus, ed. ii. 363, 1830), with a reference to Smith's observations, names the Azorean plant *E. Massoni*, in commemoration of its discoverer. If we follow Grisebach, Seubert, and Watson in considering this identical with *E. diffusa* Woods (Comp. Bot. Mag. ii. 274),—and there seems little doubt, from a comparison of Watson's Azorean specimens with a type-specimen from Woods, that they are correct in so placing it,—Sweet's name must of course stand.

given in Banks' Memorandum. His West Indian collections, as represented in Herb. Mus. Brit., are comparatively small—a fact which is explained by Banks' reference to their destruction in the hurricane of Oct. 14, 1780.

Permission having been granted for his visit to Portugal, Masson went there in 1783. He soon found opportunities of indulging his passion for work and travel. During this year he sent home numerous plants from various parts of Spain and Portugal, including Gibraltar, St. Roque, Algarbia, and Cadiz; a list of these is in the British Museum Herbarium, where also the specimens are preserved. Another list, also accompanied by specimens, shows that during the same year he found his way across to Africa, sending to Banks plants from Sallee and Tangier. He returned to Portugal, and went thence to Madeira, returning home in 1785.* At the end of this year he again set out for the Cape, which he reached on the 10th of January, 1786. On his arrival, however, he found difficulties in the way of proceeding on his travels into the interior, and at once wrote to Banks the following letter:—

Cape of Good Hope,
Jany. 21, 1786.

Sir,

I have the pleasure to acquaint you of my arrival at this place on the tenth inst., after a passage of twelve weeks. Next day I waited on the Governor, and delivered the letter from the Dutch Embassador; he treated me in the most friendly hospitable manner, but was at a loss how to act respecting my request, as it was ordered by the Company that no stranger hereafter should have liberty to explore the country. However, the letter from the Embassador and the small distance from the Cape mentioned in my instructions, after laying it before the Council, he thought himself warranted to grant the request, which he did in the genteelest, friendly manner, advising me at the same time how to conduct myself as not to excite the jealousy of the inhabitants, which was raised to a great degree on account of Mr. Patterson. Mr. Brant came up from False Bay, and exerted his influence. Colonel Gordon is in the back country, and is expected home in a month. I have collected about sixty sorts of seeds, which will be sent by Mr. Irvin, passenger in a Dane, who will touch at some port in the Channel. This I send by an Hanoverian officer, passenger in a french ship for L'Orient.

I cannot express the obligations I am under to Sir Archibald Campbell and all the gentlemen of the *E. Talbot*, who gave me assurance of a good reception in India, had I not succeeded at the Cape.

I thank you for the ready assistance you gave me at my departure. I shall remember the wine, but am sorry to inform you that it is raised from thirty Rix Dollars to eighty, and every other article in proportion.

I am, Sir,
Your most humble Servt.,
FRANS. MASSON.

So depressed was Masson by the obstacles thrown in his way, that he was anxious to be allowed to proceed to India. The fol-

* 'Annals of Botany,' ii. 592. The short account of Masson there published was furnished by "Mr. Aiton, who extracted the dates from the books of the [Kew] garden, and from some brief notices registered, at the desire of the deceased, on the frame surrounding his portrait." This portrait, an oil painting by George Garrard, is now in the possession of Mr. William Lee, of Gunnersbury, a descendant of the original James Lee, of Hammersmith.

lowing extract from a letter from George Forster to Banks, dated Jan. 30, 1786, bears upon the subject, and is interesting as throwing further light upon the foregoing, and showing the estimation in which Masson was held:—

Mr. Masson will have written you that the Dutch Government have permitted him to remain at the Cape; tho' it would seem that his Residence here is by no means generally approved of. They say that Mr. Patterson made an ill use of the Liberty that was given him, and an ungenerous return of the great kindness that was shewn him, in having accompanied Mr. Johnston in the capacity of a Guide. That such conduct was dishonourable, and wholly derogatory to the Character he was received in amongst them. Masson, whose worth and excellence there is no need of bearing Testimony of to you, is desirous of going to India, where at this time, Koning [Koenig] being dead, there is no person of his talents or Profession, and where, particularly in Bengal, there is an ample harvest of natural Curiosities to be reaped.

Could you therefore procure Masson's Mission to that Country, a benefit would be entailed on the State and Natural History, and a service rendered to an honest man.

This plan, however, fell through, and Masson remained at the Cape. The following letter, written shortly after the preceding, shows that he had settled down to work:—

Cape of Good Hope,
8th March, 1786.

Sir,

About the 8 or 9 of last month I wrote you per favour of *Mr. Irwin*, passenger on board a Danish Indiaman, who was also good enough to take charge of a parcel of seeds of about one Hundred and two species, which I hope you will receive in season to sow. Since that date I obtained permission of the Governor to visit Hottentot Holland mountains for only five days, and was so fortunate to find some of the rarest *Eruæ* and *Proteæ* in seed. I also found some new species of *Proteæ*, which is not yet described, and some other Genera, which now convinces me that these mountains, although so near the Cape, has never been properly explored. There is seed of an *Erica* which I have named *E. Banksiana*, of which you have but an imperfect specimen in your collection. It associates with *E. Plukenetii* and *E. Petiverii* in figure of the Corolla. As all the seeds are in their Capsulas, some are so minute that great attention must be had to rubbing them out when they are sown, otherwise many will be lost. *E. retorta, coronaria, pinastra, Massonii*, grows on the mountains in white sand produced from the sandstone rocks which compose the mountains, and in England will require a Turf soil mixt with a little sharp white sand.

We have three English Ships of War here, who will remain for some weeks, and will not arrive in England untill late in Summer. I therefore send part of my collection by Sir Thomas Milne, who is passenger in a Portuguese Ship bound to Lisbon. The parcel contains 117 species; a Catalogue of both parcels is enclosed.

I am, Sir,
Your most obedient
humble Servant,
FRANS. MASSON.

This is the last letter of Masson's in the Banksian correspondence. There is, however, one addressed to him by Banks dated June 3rd, 1787, from which it would appear that Masson's anxiety for travel and exploration was not cordially appreciated at home. The following are such portions of it as seem worth extracting:—

Mr. Masson,

The Plants you have sent home have succeeded so much better than any you sent home when you was last at the Cape that we have every reason to praise your industry, & to see the propriety of a search near the place of your residence in preference to expensive journeys up the country, which seldom produce an adequate return in really ripe seeds.

I hope that before this time you have taken up your head-quarters as I directed at False bay; the most rare plants to be met with in European herbariums are from that place, & you know that one rare described Plant is with two nondescripts.

I intended about this time to have asked leave of his Majesty to order you to Botany Bay; but, finding from your letter to Mr. Aiton that you had an aversion to the place, I have made interest that another person should be sent there.

In a postscript he mentions having received letters from Masson while writing the above, and adds:—

These letters mention your having undertaken 2 long Journeys, which surprised me, as your instructions are very absolute on that subject. What I recommend is a fixed residence during the ripening season at any place where plants are abundant; but more especially that my directions relative to False Bay be complied with; & till you have exhausted that place and Hart Bay, which I expect will be prov'd rich, I trust you will remain quiet; afterwards you may propose excursions.

Masson remained at the Cape until 1795, regularly sending home plants to Kew, as we may trace in the 'Hortus Kewensis,' ed. ii., where, under the genus *Pelargonium* alone, we find species introduced by him each year from 1788 to 1795 inclusive; no fewer than 47 out of the 102 species enumerated owed their introduction to Masson.

In 1795 he returned once more to England, taking up his residence at Kensington—"compelled," as he tells us in the Dedication of his 'Stapeliæ Novæ,' which he published in the course of the following year—"to leave the Cape of Good Hope, lest [he] should lose, in an expected invasion, the Collection of living Plants made during ten years residence there." He goes on to say, "I was indulged, on my return, with your Majesty's gracious permission to remain a year at home. Unwilling to waste so much time in idleness, I resolved to render this vacation somewhat profitable to the science of Botany, by publishing observations made on that subject in the interior deserts of Africa." He concludes his preface by an expression of his anxiety "to recommence [his] employment as a collector." "Still enjoying, though in the afternoon of life, a reasonable share of health and vigour, I am now ready to proceed to any part of the globe to which your Majesty's commands shall direct me. Many are the portions of it that have not yet been fully explored by Botanists —all of them are equal to my choice." His wish was gratified. "Through the recommendation of his former friend and patron, Mr. Aiton, he was appointed to explore such parts of North America, under the British Government, as appeared likely to produce new and valuable plants.*

* I quote this passage from a short memoir of Masson, published as one of a too short series on "Botanical Collectors" in the 'Gardeners' Chronicle' for 1881 (N.S. xvi. 335) by Mr. John Smith, the veteran ex-curator of the Royal Gardens, Kew. As these papers are likely to be overlooked, I append a list of the collectors noticed:—James Bowie († 1853), p. 568; Allan Cunningham (1791—1839), p. 440; Peter Good († 1803), p. 568; William Ker († 1814), p. 570; David Nelson († 1789), p. 267; Christopher Smith, p. 267; George Barclay, xvii. 305.

The information which I have been able to obtain as to the last eight years of Masson's life is derived from the "garden plant books"* at Kew, of which nine are preserved in the Director's office: to these the authorities have kindly allowed me access.

Masson arrived at New York at the end of 1797, and wrote thence to Aiton on Jan. 1, 1798, giving an account of the troubles of his voyage. "We arrived here," he says, "in great distress after a passage of 4 months from Gravesend, during which period we experienced many difficulties. Near the Western Isles we were stopp'd by two French Privateers, one of which boarded us, examined our Papers, & let us pass. Nothing happened afterwards till the eighth of November towards night saw 3 sail bearing down upon us, one of which was a French Pirate belonging to St. Domingo, who fired several shot and a volley of small arms into our ship, & soon after boarded and took possession of us." They were then put on board a Bremen vessel bound for Baltimore, and suffered many hardships from weather, want of water, and provisions; but were ultimately taken on board another vessel, and so to New York. After some stay here, Masson went to Niagara, where he arrived about the beginning of July, having taken the route by the Mohawk River and Wood Creek to Oswego, and then coasting along the shore of Lake Ontario. From Niagara he went to Queenstown, and thence to Fort Erie; he then returned to Niagara, subsequently reaching Montreal, whence he wrote to Banks the letter, dated Oct. 18, from which these particulars are extracted. Subsequent letters from Montreal, dated May 14, Oct. 17, and Oct. 26, 1805, give little information as to his work; and from a letter sent from Montreal by Mr. W. Vaughan to Mr. Aiton, dated March 18, 1806, we learn that Masson died there in December.

Our knowledge of this period of Masson's life is indeed very slight. There are in the British Museum specimens from various parts of Canada, sent by him to Banks in 1799; and Salisbury in 1805 ('Paradisus Londinensis,' t. 1) says of *Trillium grandiflorum*—"Sponte nascentem in *Upper Canada*, legit Franc. Masson." Smith says of this period of his work†—"The success of our traveller was equal to the expectations that had been formed. New plants, of interesting characters and properties, sprung up under his steps, and it seemed probable that much practical knowledge was likely to result from his discoveries."

The bulk of Masson's dried plants is in the British Museum. Some of his Cape plants are in the Delessert Herbarium, according

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* I have to thank Mr. John Smith, the ex-Curator, for putting me on the track of this information. The following extract from his letter to me will, I think, be read with interest:—"With regard to Masson's correspondence with Mr. Aiton, it, and all other correspondence of Mr. Aiton, as also that of his father, were destroyed by his brother, John Aiton, as also the list books, except about a dozen which somehow escaped; and after John Aiton's death, on my enquiring after them, they were restored to the Gardens by a Mr. Smith, a natural son of William Aiton's, who became his heir." The books in the office range in date from 1793 to 1847, that for 1825 to 1836 being wanting. There is in the Herbarium Library part of the MS. of the 'Hortus Kewensis, as well as four volumes of Collectors' Journals, &c.

† Rees' Cyclopædia.

to Lasègue,* having been acquired by Delessert at the sale of Lambert's Herbarium; and a few are in the Linnean Herbarium. From Lasègue (p. 328) we also learn that there were specimens from Masson in the herbarium of James Donn, which was acquired by Lindley; Lindley's plants are now at Cambridge. He sent specimens as well as seeds to Aiton; his *Proteaceæ* were given by Aiton to Robert Brown, and are now in Herb. Mus. Brit. Brown says—"I am indebted to the friendship of Mr. Aiton, who sent me his whole collection, peculiarly valuable as containing many of the original specimens of Mr. Masson" (Trans. Linn. Soc. x. 46); and one species at least, *Serruria Aitoni*, was known to Brown only from Masson's specimens in Herb. Aiton.

"What little property he left," says Smith, "fell into the hands of two of his nephews, and consisted chiefly of the Journals of his various travels, drawings, and collections of dried plants or other natural productions. Some of these relics have been purchased by the present Mr. Lee, of Hammersmith, a worthy friend of the original possessor."† It seems impossible to ascertain what has become of these. Mr. James Lee, of Kensington, grandson of the original James Lee, of Hammersmith, has courteously given me an interview, in the course of which he assured me that no trace of them now existed or could be found in the family. He was good enough to show me some excellent flower-drawings, dated 1771–1776, the work of his aunt, Miss Ann Lee,‡ and also an exquisite original drawing by Redouté of *Campanula medium*, the history of which he gave me. Redouté was in England making drawings for publication from a valuable collection of butterflies in the possession of his father, who entertained the artist at his house while the work was in progress. When it was finished, Redouté said he must leave something in acknowledgment of the kindness with which he had been treated, and, going into the garden, brought in a Canterbury Bell, from which he made a drawing and presented it to Mr. Lee. It is a beautiful example of his work. The present Mr. James Lee has also an oil-portrait of his grandfather, painted by George Garrard.

Smith's notice ends with the following summary of Masson's life and work:—

> We cannot conclude better than in Mr. Lee's own words.:—"Masson was of a mild temper, persevering in his pursuits, even to a great enthusiasm; of great industry, which his specimens and drawings of fish, animals, insects, plants, and views of the countries he passed through evince. And though he passed a solitary life, in countries distant from society, his love of natural history never forsook him. Characters like him seem for the present dwindling in the world, but I trust they will revive. If a selection of his memoranda would be acceptable to the world, there is matter enough to carry it to a great extent."

I hope to give in the next 'Journal' some notes on Masson's drawings.

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* Mus. Bot. Delessert, 75, 302, 504.

† See also Bot. Mag. t. 1088.

‡ We have in the Department of Botany a volume of very beautiful drawings of Mesembryanthemums executed by this lady.

SHORT NOTES.

Eugenia microphylla Abel. — In my paper on Chinese Oaks I have unearthed two of Abel's species, and the object of this note is to rescue the following description of another species from the limbo of his "Narrative":—*Eugenia microphylla* Abel (Narr. of Journey in Interior of China, p. 364). "E. foliis obovatis basi attenuatis subtus punctatis racemis terminalibus folio longioribus. Frutex sesquipedalis a basi ramosus, rami teretes suberecti, ramuli patentes. Folia subsemiuncialia verticillata, in ramis adultis sparsa, breve petiolata, in petiolo attenuata, supra glabra nitida obsolete venosa, subtus punctata, punctis sparsis. Pedunculi terminales, trichotomi, multiflori, sparsim squamosi. Baccæ pisiformes, purpureæ ad basin bracteis duabus squamiformibus instructæ, monospermæ. Cotyledones plano-convexæ." The plant was gathered near Nan-gan-fou, at the most southerly point of Kiang-si Province, close to the border of Kwang-tung, and is further mentioned by Abel on page 181:—"A new species of *Eugenia*, which, as it is perhaps the smallest of its genus, has been named *E. microphylla*, covered the declivities of almost every hill in the province of Kiang-si. It is a very elegant plant, strongly resembling a myrtle, and grows to the height of one or two feet. It bears thick terminal clusters of dark purple berries, which were eaten by our Chinese attendants." As in the case of the oaks, my search for the type specimen of this plant has proved unsuccessful. Judging, however, from the description given by Dr. Hance of his *E. pyxophylla* (Journ. Bot. 1871, p. 6), it must be very closely allied to Abel's species, if the two are not ultimately found to be identical. A plant, collected by Dr. Shearer near Kiu-kiang (Kiang-si) and partially described by Mr. S. Moore (Journ. Bot. 1875, p. 227) as probably a new species, may also prove to be referable here.—F. B. Forbes.

Cell-sap Crystals.—Crystals of the colouring material present in the petals and other portions of plants are by no means common, or, as a rule, easy to obtain. It may therefore interest some to know, that the rich, violet-coloured cell-sap in the flower of *Justicia speciosa*, a common and easily-grown stove-plant, crystallizes very easily into minute slender prisms. To obtain them it is only necessary to mount a fragment of the flower-stamen for choice, in dilute glycerine jelly, not too hot, without any previous treatment; after a few hours the colouring material collects into a few cells, in the form of the crystals above-mentioned, forming a very pretty and interesting object for a quarter-inch objective.—Greenwood Pim.

Brecon Plants not recorded in 'Topographical Botany.'—*Caltha palustris*, *Ranunculus auricomus*, *R. Ficaria*, *Viola odorata*, *Malva moschata*, *Geranium molle*, *G. Robertianum*, *Vicia Bobartii*, *V. Bithynica* var. *angustifolia*, *Saxifraga tridactylites*, *S. granulata*, *Lonicera Periclymenum*, *Sherardia arvensis*, *Scabiosa Succisa*, *Filago germanica*, *Digitalis purpurea*, *Veronica serpyllifolia*, *V. officinalis*,

V. montana, *Euphrasia officinalis*, *Bartsia Odontites*, *Melampyrum pratense* type, *Origanum vulgare*, *Prunella vulgaris*, *Lamium album*, *Ajuga reptans*, *Teucrium Scorodonia*, *Orchis incarnata*, *Scilla nutans*, *Cryptogramma crispa*, *Athyrium Filix-fœmina*, *Scolopendrium vulgare*, *Aspidium Aculeatum*, *Polypodium vulgare*. The above additions to the flora of Co. 42 were found within a mile or two of the town of Brecon, by my daughter, who has also given me a list of other new records from the same locality, but I wait till specimens are sent before recording these.—Alfred Fryer.

Agrostis nigra With. in Cambridgeshire.—In 1881 I gathered two specimens of *Agrostis*, near Chatteris; one of these was growing, amongst corn, on sandy soil at Langwood Hill, associated with *Myosurus minimus*, *Montia fontana*, *Vicia hirsuta*, *V. tetrasperma*, and *Myosotis versicolor*, all of which are rare and very local plants in this District 7 of Prof. Babington's 'Flora of Cambridgeshire.' The other grew at Rushbeach, on a continuation of the same ridge of "high-land," but where the subsoil is an outlier of the fossiliferous "March gravel," and in which station *Montia* also grows freely as a cornfield weed. The Langwood Hill plant I referred, with some hesitation, to *Agrostis vulgaris* With., but this specimen, Mr. Arthur Bennett tells me, is "certainly *nigra*," of which he kindly sent me typical examples, collected by Mr. J. E. Bagnall in Warwickshire. The Rushbeach plant I referred, less doubtfully, to *A. alba* L., but this agrees exactly with Mr. Bagnall's specimens. Perhaps these trivial details may serve to guide other field botanists to the discovery of new localities for a plant which is likely widely spread, but passed over as one or other of our more common species.—Alfred Fryer.

Carex trinervis Degland, in England.—With Mr. W. W. Reeves I was looking over some duplicates from Norfolk, belonging to Mr. H. G. Glasspoole, when I found among them four specimens of a *Carex* that I at once saw was very near *C. trinervis* of Degland, if not that plant. Careful examination since, of the specimens, with others, from the west of France and the East Friesian Islands (which I owe to the kindness of M. Lloyd and Dr. Buchenau), and the plates of Drejer and Boott, leave no doubt that it is that species. Crépin, in his interesting 'Notes sur quelques plantes rares ou critiques de la Belgique,' fasc. iii., pp. 29, 30, remarks:—"Il est étonnant qu'on n'ait point encore observé ce *Carex* sur les côtes d'Angleterre." Mr. Glasspoole's specimens were gathered in 1869–70, and I trust he will regather it this season for distribution. It should be looked for in the sands of Barrie, Forfar, and the Lincolnshire and Suffolk coasts.—Arthur Bennett.

NOTICES OF BOOKS.

The Annual Report of the Belfast Naturalists' Field Club for 1882–83 contains a 'Supplement to a List of Mosses of the North-East of Ireland,' by Mr. S. A. Stewart.

Although bearing date 1882, the seventh part, concluding Vol. I. of Mr. R. D. Fitzgerald's valuable work, 'Australian Orchids,' has only just reached us. It is prefaced by two useful synopses, the first showing the history of each species, the second its geographical distribution. Among the plants figured is *Dendrobium Smithiæ* F. Muell., which Mr. Fitzgerald takes as the type of a new genus, *Cælandria*. "In the true *Dendrobium*," he says, "the labellum will be always found to be articulate, indicative of a distinct method of fertilization; in this proposed genus it is united to the column, forming with it a nectary which contains honey." There are also figures of two of the author's species of *Caladenia*—*C. arenaria* and *C. concolor*—and of a doubtful new species of *Diuris*—*D. dendrobioides*. The figures exhibit the same abundance of detail which has hitherto characterised them, and Mr. Fitzgerald's notes on fertilization are as usual of much interest.

New Books.—U. A. Poulsen & W. Trelease, 'Botanical Micro-Chemistry' (8vo., pp. xviii., 118: Boston, Cassino, 1 dol.).—E. Strasburger, 'Die Controversen der indirecten Kerntheilung' (8vo, pp. 62, tt. 2; Bohn, Cohen).—Mme. Le Breton, 'Botanique pour Tous' (ed. 2, 8vo., pp. xv., 536: Paris, Rothschild).—H. Baillon, 'Dictionnaire de Botanique' (pt. xvi., Dich–Duorb).—J. Jaggi, '*Trapa natans* und der Tribulus der Alten' (4to, pp. 34, t. 1: Zurich, Schmidt).

Articles in Journals.

Botanical Gazette. — W. G. Farlow, 'Additions to *Peronosporeæ* of United States.'

Bot. Centralblatt (Nos. 10–12). — A. F. W. Schimper, 'Ueber Bau und Lebensweise der Epiphyten Westindiens.'—(No. 13). F. Ludwig, Memoir of Hermann Müller (portrait).

Botanische Zeitung (Feb. 29). — O. Loew, 'Noch einmal über das Protoplasma' (concl.). — E. Warming, 'Zur Geschichte der Wurzelknotenbehaarung.' — (Mar. 7, 14, 21). E. Stahl, 'Zur Biologie der Myxomyceten.' — (Mar. 21). M. Schert, 'Die Wasserbewegung in Holze.'

Bull. Bot. Soc. France (Feb. & Mar.: vol. xxx. Comptes Rendus, parts 5 & 6).—E. Burnat, 'Le *Saxifraga florulenta* espèce Française.' — A. Battandier, 'Sur quelques plantes d'Algérie' (*Erodium medeense*, n. sp.). — L. Trâbut, 'Les Graminées des sommets du Djurdjura.' — M. Grúnier, 'Sur la faculté asséchante des arbres forestiers.' — L. du Sablon, 'Sur la tige de la *Wistaria sinensis*.'—L. Koehne, 'Les Lythrariées françaises.' — A. Lemaire, 'Sur l'origine des racines latèrales chez les Dicotylèdones.'—L. Trabut, 'Sur l'existence de *Pennisetum* à un seul stigmate.'—P. Duchartre, 'Sur une fleur sémi-double de *Nægelia*.' — C. E. Bertrand, 'Sur le genre *Vesquia*.' — R. Gérard, 'Structure de l'axe des *Œnanthe*.' — L. du Sablon, 'Sur la déhiscence des fruits secs.' — P. Van Tieghem & L. Morot, 'Sur l'anomalie de structure de la tige des *Stylidium*.' — P. Van Tieghem, 'Sur la situation de l'appareil

sécréteur dans les Composées.' — L. de la Chapelle, 'Lichens de Cauterets.'

Bulletin of Torrey Bot. Club (Feb.). — F. Wolle, 'Freshwater Algæ' (1 plate; many new species).—J. B. Ellis & B. M. Everhart, 'New N. American Fungi' (*Rhizoctonia monilformis*, *R. aurantiaca*, *Zygodermus muricatus*, *Rhinotrichum sulfureum*, *Stilbospora fenestrata*, *Nidularia rubella*, *Peziza glenospora*, spp. nn.).

Flora (Feb. 1, 21, Mar. 11).—P. Blenk, 'Ueber die durchsichtigen Punkte in den Blätten.' — K. B. J. Forssell, 'Lichenologische Untersuchungen' (contd.). — (Feb. 11, Mar. 11). F. Arnold, 'Die Lichenen des fränkischen Jura.' — (Mar. 1, 11). P. Grassmann, 'Die Septaldrüsen, Ihre Verbreitung, Entschung, und Verichtung' (2 plates).—(Mar. 21). P. F. Reinsch, 'Beobachtung von Bakterien und ein zelligen Algen auf der Oberfläche der Kursirenden Geldmünzen.'

Garden (Mar. 1). — *Vanda insignis* and var. *Schræderiana*, ic. pict. — (Mar. 8). *Schizostylis coccinea*, ic. pict. — (Mar. 15). *Helichrysum grandiceps* (fig.). — *Nymphæa zanzibarensis*, ic. pict. — (Mar. 29). *Eucharis Sanderiana*, ic. pict.

Gardeners' Chronicle (Mar. 1). — *Dendrobium vexabile* Rchb. f., 'n. sp. (?), hyb. nat.' — C. B. Plowright, 'Jensen on the Potato-disease' (contd.). — (Mar. 8). *Dendrobium signatum* Rchb. f., n. sp. —M. T. Masters, '*Picea Omarika*' (3 figs.). — W. Phillips, '*Acmosporium tricephalum*, n. sp.' (fig. 61). — Obituary of Engelmann (1820–1884). — (Mar. 29). *Blechnum rugosum* Moore, *Doodia Harryana* Moore, *Masdevallia Mooreana* Rchb. f., nn. spp.—*Corynium Beijerinckii* (fig. 74).

Grevillea.—J. M. Crombie, 'Lichens in Withering's Herbarium.' —W. Johnson, '*Sirosiphon saxicola* Næg.' (from Ennerdale, Cumberland). — M. C. Cooke, 'Notes on Hypocreaceæ.' — Id., 'New Californian Fungi.' — Id., 'Exotic Fungi.'

Knowledge (Mar. 7, 21).—G. Allen, 'The Integration of Flowers.'

Magyar Növénytani Lapok (Jan.). — G. Schaarschmidt, 'The thickening of cell-walls and the cellulin-granules in *Vaucheria* and *Chara*.' — (Feb.). Id., 'On the continuity of Protoplasm through cell-walls and its occurrence in intercellular spaces.' — V. Borbás, '*Ceratophyllum Haynaldianum*, n. sp.'

Midland Naturalist. — W. Hillhouse, 'On the Intercellular Relations of Protoplasts.'—J. E. Bagnall, 'Flora of Warwickshirer (contd.: *Borragineæ—Primulaceæ*).

Oesterr. Bot. Zeitschrift. — W. Voss, 'Carl Zois' (1756–1800). — J. L. Holuby, 'Neue Brombeeren' (*Rubus coriaceus*, n. sp., *R. tomentosus* × *Vestii*). — D. Hirc, 'Floristiches aus Croatien.' — E. Formánek, 'Teratologisches.' — J. Murr, 'Zur Flora von Nordtirol.' — L. Wiedermann, 'Flora von Rappolten Kirchen.'— V. v. Borbás, 'Achsengebilde der Hagebunte.' — J. B. Wiesbaur, 'Bosniche Rosen.' — J. A. Bäumler, 'Moosflora von Pressburg.'— P. G. Strobl, 'Flora des Etna' (contd.).

Science Monthly. — G. C. Chisholm, 'Lessons from Common Plants' (*Solanum*).

BOTANICAL NEWS.

Mr. Bryce merits and will no doubt receive the thanks of all naturalists for the Bill which he is introducing into Parliament to secure access to mountains and moorlands in Scotland. The Bill should be supported in every possible way by Natural History Societies throughout the country, so that some check may be put upon the selfishness and churlishness of noble and other owners of land in Scotland and elsewhere. The attempt to discredit the Bill by harrowing descriptions of what might happen if it passed seems to be based on an assumption that the Highlands, for example, are within easy access of the London "loafer."

OBITUARY.

John Hutton Balfour was born at Edinburgh, Sept. 15, 1808. Undecided as to his future during his student life, and including divinity as well as science among the subjects of study, he at length began to practise medicine in Edinburgh. With an early developed love of science, he became, under the iufluence of Prof. Graham, specially devoted to botany, and lectured on this science in Edinburgh, while he was following his medical profession. With other men who have left their mark in botany like Hewett Cottrell Watson, Walker Arnott, Greville and Parnell,—and with Babington and Prior, happily still with us,—he formed in 1836 the Edinburgh Botanical Society. When Sir William Hooker left Glasgow for Kew, Balfour was appointed his successor, and a few years later (in 1846), he succeeded Dr. Graham in Edinburgh University. It is impossible to estimate the immense service Dr. Balfour rendered to science in this important position. Possessed of a remarkable power of expressing clearly his opinions, and of securing the attention of his hearers, he for thirty-three years lectured to the largest class of botanical students that ever met in a class-room. And although the members of this class were present mainly because botany was one of the elements in their medical curriculum, yet a large proportion of the eight thousand who passed through his classes left them with a genuine love of plants. This was perhaps due as much to the excursions which he conducted weekly during the greater part of the session, as to the lectures in the class-room. Dr. Balfour was at his best when he was disclosing the floral treasures of some deep glen or rich mountain side, to his company of a hundred or more students. It was seldom that he needed to consult a Flora, so familiar was he with all the plants of Scotland; but it was always a valuable lesson when he pulled out his thin-paper Babington, and ran down some less familiar or critical species. In every country of the world his students will be saddened to hear of the death of their friend and teacher, which took place at Edinburgh, on the 11th of February.

NEW OR NOTEWORTHY FUNGI.

By W. B. Grove, B.A.

(Plates 245 & 246.)

The following is, for the most part, the substance of a paper which was read before the Birmingham Natural History and Microscopical Society, Nov. 6th, 1883, giving an account of the more important recent additions to the Fungus Flora of their district. Unless otherwise mentioned, it will be understood that all the localities are in the immediate neighbourhood of that town. Wk. = Warwickshire; Ws. = Worcestershire; St. = Staffordshire.

**Agaricus* (*Amanita*) *nitidus* Fr. Hym. Eur. p. 24. — In the woods surrounding Coleshill Pool (Wk.), September. The pileus of my specimens agreed exactly with Fries's description, in the thick, angular, hardened and dark-coloured warts, on a whitish pileus. There were other specimens, in another part of the same wood, which it was difficult to distinguish from *A. mappa* Batsch. None of them resembled the figure in Cooke's 'Illustrations,' pl. 70, very closely.

**A.* (*Tricholoma*) *stans* Fr. Cooke, Ill. pl. 198. — Edgbaston Park (Wk.), October, where I found, growing together on the margins of a wood, what seem to be the two forms mentioned by Fries (Hym. Eur, p. 52) as vars. *campestris* et *montana*.

**A.* (*Clitocybe*) *opacus* With. Cooke, Ill. pl. 176. — Sutton Park (Wk.), October. My specimens probably belong to Withering's species, as they were distinguished from the closely similar *A. cerussatus* by the umbo and the pure-white shining film of the pileus.

**A.* (*Mycena*) *pseudo-purus* Cooke, Ill. pl. 158 *a*. — This has occurred both in Edgbaston Park and New Park, Middleton (Wk.), October. My specimens agree exactly with Cooke's figure, but are rather smaller; the stem turns brown in drying, the upper surface of the pileus becomes pallid, but the flesh when broken is seen to retain a rosy tint.

**A.* (*M.*) *pullatus* Berk. & Cooke, Ill. pl. 237. — Coleshill Pool, (Wk.), September. The contrast between the pure-white gills and the purple-black pileus is striking. Apex of stem minutely farinose.

1. †A. (*M.*) galopus, var. candidus mihi. — Altogether pure white. Lady Wood, Four Oaks (Wk.), September. Milk abundant.

**A.* (*M.*) *leucogalus* Cooke. — New Park, Middleton (Wk.), October 7th. In the paper which I read I introduced this to the Birmingham Society as a new species; and in the December number of 'Grevillea' (xii. 41) I find it described under the name given above. The sulcate, purple-black pileus, white milk, and cinereous gills easily distinguish it. I noted at the same time its external resemblance to *A. pullatus*.

2. *A.* (*Psilocybe*) *udus*, var. *polytrichi* Fr. Hym. Eur. p. 298.— Amongst the Lickey Hills (Ws.), in a little swampy patch, with the type; September. See 'Midland Naturalist,' vi. 209. My

specimens seemed to partake also of the character of the var. *elongatus*, in that the pileus was striate when moist, and a suspicion of a greenish colour pervaded the pileus and gills; but the former was nearly *plane*, adorned near the margin with whitish fibres, as of the veil; gills decurrent. The type form has also occurred at Coleshill Pool, and in Sutton Park (Wk.).

**A.* (*Panæolus*) *fimicola* Fr. Hym. Eur. p. 312. — I have found a fungus at Sutton (Wk.), and in the Warley Woods (Ws.), agreeing with Fries's description of this species, except that the narrow dark-brown zone on the margin disappears when the pileus is *quite* dry, although it persists for a long time after the rest of the pileus has assumed its normal pale clay-colour. September and October.

**Russula drimeia* Cooke, Grevill. x. 46. — Sutton Park (Wk.), November. Remarkable for its purple pileus, its firm purple-clouded stem, and its yellow-ochraceous gills. Mr. J. E. Bagnall gathered the same species a few days previously at Packington.

**Lentinus cochleatus* Fr. Hym. Eur. p. 484. — New Park, Middleton (Wk.), October. Agreeing exactly, except that the aniseed-odour was not "debilis," but the contrary.

3. †Phlebia merismoides, var. albo-marginata Phillips *in litt.* Margine albo-radiato.—Sutton (Wk.), on a prostrate log, January. Distinguished from the type by its beautifully-white radiate byssoid margin.

**Uromyces Poæ* Raben.; Winter, Pilze, i. p. 162. — Harborne (Ws.), July; Salford Priors (South Wk.), August. On species of *Poa*, near to places where *Œcidium Ficariæ* had grown in the spring. In the first instance the *Œcidium* was on *Ranunculus repens*, in the second on *R. Ficaria*.

**Puccinia linearis* (Rob.) Desmaz. Ann. Sc. Nat. Ser. 4, iv. 125 (1855). — *P. sessilis* Schrötr. — *P. Brachypodii* Fckl. Symb. p. 60 (1869). — *P. Baryi* Winter, Pilze i. 178 (1884). Uredo-spores:— *Epitea Baryi* B. & Br. Ann. & Mag. N. H. 755 (1854). — *Epitea Brachypodii* Otth. (1861). — *Lecythea Baryi* Cooke, Handbk. p. 532 (1871). — Both stages at Harborne (Ws.), August, on *Triticum repens*; uredo-spores only, at Solihull (Wk.), on *Brachypodium sylvaticum*. I have also a specimen (uredo) from Yorkshire, on *Aira cæspitosa* (H. T. Soppitt). It is also recorded on *Phalaris arundinacea-variegata* (Saccardo), on *Lolium perenne* (De Bary), and on *Brachypodium pinnatum* (Winter, Bloxam).

4. †P. ægra mihi, Journ. Bot. 1883, p. 274. — Sutton (Wk.), Moseley (Ws.), Perry Barr (St.). To the description given (*l. c.*) should be added that, towards the end of the season, the teleuto-spores attack the stems also, where they form little clusters of pustules. I have also received the same species from Lurgan, Ireland (Rev. H. W. Lett). (Tab. 245, f. 1).

**P. suaveolens* Schröter; Winter, Pilze, p. 189 (1884). — *P. obtegens* Tul. Ann. Sc. Nat. (1854); Fuck. Symb. p. 54. Uredo-spores only:—*Uredo suaveolens* Pers. Obs. Myc. ii. p. 24 (1799); Syn. p. 221 (1801). — *Trichobasis suaveolens* Lev.; Cooke, Handb. p. 530. Spermogones:—*Sphæronema Cirsii* Lasch.

The uredo is only a stage of a *Puccinia*, the teleuto-spores of

which resemble those of *P. compositarum*. The odour is due to the spermogones, which first appear on the under side of the leaf. The same mycelium then produces the uredo-pustules, which are large, and, when burst, cover the whole leaf. Later, on other leaves of the same plant, or on those of neighbouring plants, smaller pustules appear, which contain both the uredo- and teleuto-spores; these probably originate from the germination of the uredo-spores of the first generation. This is the history, observed at Edgbaston and Water Orton (Wk.), on *Carduus arvensis*. August and September.

5. *Melampsora lini* (Pers.). — Near Abergele, North Wales, August. On *Linum catharticum*. This is the teleuto-spore of *Lecythea lini* Lev.; Cooke, Handb. p. 532, of which only the early stage has been hitherto recorded in Britain, to my knowledge.

"Pustules roundish, elliptic or linear, often confluent, black-brown, shining; spores oblong or wedge-shaped, brown, one-celled, intercellular, polygonal in transverse section, reaching 44 μ long, and about 18 μ broad."—Winter, Pilze, p. 242.

**Peronospora densa* Rabenh.—Harborne (Ws.), August. On the lower surface of the leaves of *Bartsia Odontites*. This species has been only mentioned by name (Grev. v. p. 65), but not described as a British species. The following description is drawn up from my specimens:—

Crowded into a dense snow-white crust. Fertile stems fasciculate; apex simple, subulate, or shortly once, twice, or thrice dichotomous, occasionally trifurcate; branches few, spreading, divided similarly to the apex; ultimate ramuli nearly straight, subulate. Acrospores unequal, broadly ovoid, ellipsoid or subglobose, 18–22 μ × 14–18 μ; apex obtusely papillate. (Tab. 245, f. 2).

6. *Pilobolus œdipus* ‡ Montagne, Mém. de la Soc. Linn. de Lyon, pp. 1–7, *cum icon.* (1828); Coemans, Mon. du Genre Pil. p. 59, pl. 1, figs. 1–20 (1861); Fuck. Symb. p. 73 (1869); Van Tiegh. Nouv. Rech. sur les Muc. p. 43 (1875); Saccardo, Mich. ii. 372 (1881); Bainier, Etude sur les Muc. pp. 43–4, pl. 2, figs. 1–10 (1882).— *P. crystallinus* Cohn, Entwickl. des Pil. cryst., with figs. (1851).—Non *P. œdipus* Klein, Zur Kennt. des Pil.; *nec* Brefeld, Bot. Unt. iv. 69.

Stem short and thickish; swelling ovoid; basal reservoir roundish, usually above the matrix. Spores yellow, spherical, rather unequal, 10·5–14·5 μ, with a distinct thick bluish epispore. On cow and pig's dung, Sutton (Wk.), December to February. (Tab. 245, f. 3).

7. *Pilobolus Kleinii* Van Tieghem, Trois. Mém. sur les Muc. pp. 26–7, pl. 10, figs. 6–10 (1878); Bainier, *l. c.*, p. 43, pl. 2, figs. 14–5 (1882). — *P. crystallinus* Klein, *l. c.*, p. 360, pl. 23–7 (1870); Brefeld, Bot. Unt. iv. p. 70, pl. 4, fig. 15 (1881), et mult. aliorum (*nec* Tode et Coemans). — *P. roridus* Currey, Proc. Linn. Soc. Bot. i. pp. 162–7, pl. 2, figs. 1–10 (1857).

Stem rather slender; swelling ovoid. Spores oval, orange, not

‡ Not *Œdipus*; but adjectival, = *swoln-footed.*

granular when mature, without conspicuous epispore, averaging 15 × 8 μ. On cow and horse dung, Sutton; Water Orton (Wk.); Harborne; Clent (Ws.), &c. Without doubt frequently recorded as *P. crystallinus* or *P. roridus*, from both of which it differs. September to March. (Tab. 245, f. 4).

8. †P. Kleinii, *forma* sphærospora, mihi.—Sporis irregularibus, ut plurimum sphæricis granulosis.—Van Tiegh. Trois. Mém. p. 26. — *Pilobolus lentigerus* Corda, Icon. i. fig. 286 (1837); Bonorden, Handb. p. 128 (1851). — *Pycnopodium lentigerum* Corda, Icon. v. p. 18 (1842). — *Pilobolus crystallinus* Bon. Handb. p. 128, fig. 203 (1851).—*P. œdipus* (*b* and *c*) Klein, *l. c.*, p. 360, pl. 27, fig. 50; pl. 26. fig. 40 *b* (1870); Brefeld, Bot. Unt. iv. p. 69, pl. 4. fig. 14 (1881).

Distinguished by its spores, which are often exactly spherical, sometimes elliptic, roundish, and irregular in the same sporange; mostly with numerous granules, without conspicuous epispore, orange or yellow, varying greatly in size, when round averaging 12–16 μ diam. This usually appears first in a culture of *P. Kleinii*, and gradually passes into the normal form; but I have sometimes known it persist for a week or two without doing so. Corda's figure, compared with the description of *Pycnopodium* (*l. c.*, v. 18), evidently represents a badly-nourished state of this, and not of *P. œdipus*; and this form is also Bonorden's *crystallinus*, and the *œdipus* of Klein & Brefeld. (Tab. 245, f. 5).

PILAIRA Van Tieghem (1875).‡

Mucorine. Sporange like that of *Pilobolus*, but not projected. Cuticle of upper part of sporange thick, indurated. Stem without a swelling at the summit, and with no septum at the base.

9. *Pilaira Cesatii* Van Tiegh. Nouv. Rech. p. 51, pl. 1, figs. 14–24 (1875); Bainier, *l. c.*, pp. 29–32, pl. 1, figs. 16–8 (1882). — *Pilobolus anomalus* Cesati, Herb. Myc. Kl. ed. i. 1542 (1851); Fckl. Symb. p. 73 (1869); Brefeld, Bot. Unt. iv. pp. 60–5, pl. 4, figs. 18, 23–8 (?), (1881). — *Ascophora Cesatii* Coemans, Mon. pp. 64–5, pl. 2, fig. E (1861). — *Pilobolus Mucedo* Brefeld, *l. c.*, i. p. 27, pl. 1, figs. 25–6 (?), (1872).

Stem tall, slender, equal, ultimately flexuous and collapsing, forming a small granular apophysis below the hemispherical sporange; columella flatly convex. Spores oval, singly colourless, faintly yellowish in mass, equal, 8–10 μ × 6 μ (Van Tiegh., Bainier), 13–16 μ × 10 μ (Coemans), 7·5 μ × 4 μ§ (Brefeld), 11–12 μ × 7 μ (mihi). (Tab. 245, f. 6).

Amongst Mucor, Edgbaston; December, January. Stem 8–10 cm. high; sporange about 0·16 mm. diam. Resembling *Mucor Mucedo*, but easily distinguished by its *Pilobolus*-like sporange. Brefeld appears to have confused this and the following species inextricably together.

10. †Pilaira dimidiata, sp. n. (*P. inosculans* mihi, olim, 'Midl. Nat.' vi. 119).—*Pilobolus anomalus* Brefeld, *p. p.*

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‡ πῖλος, a hat; αἴρω, I raise.

§ Brefeld says in the text, "·006 mm. broad," but his figure is 4 μ broad.

P. stipite curto, gracili, æquali, apice denique nutante; sporangio primo flavido, dein nigro; columella leviter colorata, convexa, prope æquatorem vesiculæ apicalis inserta, itaque apophysin magnam hyalinam præbente, ubi adest in fungo vegeto constrictio profundula; sporis hyalinis, dilutissime flavidis, ellipticooblongis, 12–14 μ × 5–6 μ. (Tab. 245, f. 7).

On dog's dung, near Quinton (Ws.), March, April. Stem ½–1 mm. high, when the sporange becomes black; afterwards increasing to 3–4 mm. Sporange 0·10–0·12 mm. diam. Distinguished from *P. Cesatii* not only by its much smaller size, but also by its peculiar apophysis, which is almost as large as the sporange, but slightly less in diameter, and not granular. Hence the name. It can scarcely be a badly-nourished form of *P. Cesatii*, as it grew luxuriantly on a rich substratum.

11. *Mucor macrocarpus* Corda, Icon. ii. p. 21, fig. 84 (1838); De Bary & Wor. Beitr. ii. p. 34 (1866); Zimmermann, das Genus Mucor, p. 48, figs. 36–9 (1871). — Mycelium internal; fertile stems erect, straight, subulate, simple, septate (or scarcely so), brownish; sporangium globose, glabrous, milk-white, then black, shining, with a thin, translucent, iridescent membrane; columella oblong or hemispherical, yellowish. Spores broadly fusiform, acute at each end, coarsely granular, brownish, 50 μ × 16–20 μ.

Four Oaks Park; New Park, Middleton (Wk.). On species of *Mycena* (*galericulata*, *pseudo-pura*, and *leucogala*). Stem reaching 6–7 mm. or more, always swollen below. Sporange about 0·25 mm. in diam. (Tab. 245, f. 8).

This species is usually confounded with *M. fusiger* Link. (*Spinellus fusiger* Van Tiegh.),‡ from which it differs mainly in the following points:—In *M. macrocarpus* the mycelium is usually confined to the interior of the Agaric; in *M. fusiger* the mycelium, which is spiny, forms an abundant byssoid layer on the exterior of the host. The spores of the former average 16-20 μ in breadth, reaching as much as 24 μ, are acute at the ends, and have a brownish epispore and coarsely granular contents; the spores of the latter are about the same in length (50–60 μ), but much narrower, averaging 8–10 μ in breadth; and have the epispore of a bluish black, the contents scarcely granular, and the extremities obtuse. When viewed in the mass, the difference in colour of the spores is very decided: the number of spores in a sporangium of *M. fusiger* seems to be always considerably more than in that of *M. macrocarpus*. Moreover, the stem of the former is simple, but often originates from the union of two or three mycelial filaments; while the stem of the latter is frequently branched at the base, but originates from a single hypha of the mycelium.

12. *Sporodinia grandis* Link, Spec. Plant. vi. p. 94 (1824); Bonorden, Handb. p. 125, fig. 160 (1851); De Bary, Beitr. i. p. 218, pl. 30, figs. 1, 2 (1864); Van Tiegh. Nouv. Rech. pp. 85–8, pl. 1, figs. 40–2 (1875); Saccardo, Mich. i. 551 (1879); Bainier,

‡ See, *e.g.*, 'Science-Gossip,' Oct. 1883, fig. 135, which on p. 279 is stated to be the sporange of *M. fusiger*, but is evidently drawn from a specimen of *M. macrocarpus*. *M. fusiger* Cooke, Handb. p. 631, is the true species.

l. c., pp. 59–61, pl. 4, figs. 1–5 (1882). — *S. dichotoma* (?). — *Mucor Aspergillus* Scop. Fl. Carn. No. 1642 (*fide* Zimmermann), (1772); (?) Pers. Syn. p. 200 (1801); Zimmermann, *l. c.*, p. 50, figs. 26–8 (1871). — (?) *Aspergillus maximus* Link; Berk. Eng. Fl. p. 340 (1836). — *Nematogonium simplex* Bonord., *l. c.*, p. 116, fig. 186 (1851). — *Mucor dichotomus* Brefeld, Bot. Unters. iv. pp. 95–6, pl. 6, figs. 23–5 (1881).

Stems erect, cylindrical, crowded, brownish, 5–6 times dichotomous above; branches short, diverging at an obtuse angle, lying in planes alternately at right angles to one another, at length septate as well as the stem. Ultimate ramuli swollen, fusiform, terminated by a globular, evanescent, few-spored sporange, beneath which is a small apophysis; columella convex. Spores roundish, unequal, granular, with a smooth brownish epispore, 20–35 μ (Van Tiegh.), 11–40 μ (De Bary), averaging 12 μ (Zimmermann). (Tab. 245, f. 9).

Coleshill Pool (Wk.), on *Cortinarius*; September. It seems somewhat doubtful whether *S. dichotoma* Corda is really distinct (Icon. i. 284); its sporangia are obovate, and the spores are described as hyaline or colourless; if these differences prove to be constant, the species may well be separated. Saccardo, *l. c.*, unites them. *Nematogonium simplex* Bon. is undoubtedly *S. grandis* Link, although Fuckel (Symb. p. 74) refers it to *S. dichotoma*. *Mucor Aspergillus* Pers. (*l. c.*) seems more likely to be *S. dichotoma*.

CHÆTOSTYLUM Van Tiegh. (1873).‡

Mucorine. Stem erect, sporangiferous, bearing below pseudo-verticils of branches, which may be again similarly branched. Ultimate ramuli terminating in a sporangiole, intermediate ones in a subulate point. Sporangioles 2 to many-spored.

Distinguished from *Chætocladium* by its definite mode of growth, and sporangioles with a variable number of spores.

13. *Chætostylum Fresenii* Van Tiegh. Rech. sur les Muc. pp. 72–5, pl. 23, figs. 61–3 (1873); Bainier, *l. c.*, pp. 89–92, pl. viii. (1882).—*Mucor Mucedo* Fresenius, *p. p.*, Beitr. zur Myk. iii. pp. 96–7 (1863); Zimmermann, *l. c.*, figs. 5–6 (1871).— (?) *Bulbothamnidium elegans* Klein, Mykol. Mittheil. (1870).—*Thamnidium chætocladioides* et *T. simplex* Brefeld, Bot. Unt. iv. p. 58, pl. 2, figs. 5–8 (1881).

Terminal sporange rather large, many-spored, with a diffluent membrane; columella obovate. Sporangioles deciduous, with a persistent membrane. Spores equal, oval, colourless or faintly grey, averaging 8 $\mu \times 5$ μ (Van Tiegh.), 8·4 $\mu \times 4{\cdot}2$ μ (Bainier), 11–12 $\mu \times 5{\cdot}5$–6 μ (mihi).

The whole plant is colourless, from $\frac{1}{4}$ to $\frac{1}{2}$ inch high, the lower part provided with numerous false whorls of branches, which usually bear about their middle, on a bulbous swelling, secondary branches, each terminating in a sporangiole. Occasionally the

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‡ χαιτή, long hair; στῦλος, a pillar. Named from its mixed resemblance to *Chætocladium* and *Helicostylum*.

branches are of a third or even fourth order; the higher the order, the smaller and fewer-spored the sporangioles; they may even be reduced to one spore.

On dog's dung, Malvern (Ws.), April.

CHÆTOCLADIUM Fres. (1863).‡

Mucorine. Fertile hyphæ repeatedly branched; each node producing a whorl of from two to five branchlets, the central one abortive and terminating in a subulate point, the others branched again in a similar manner. Sporangia in terminal or subterminal clusters, monosporous.

The type of this genus is *C. Jonesii* Fres. Beitr. iii. 98 (1863).—*Botrytis Jonesii* Berk. Ann. Nat. Hist. 760 (1854); Cooke, Handbk. p. 592 (1871). Cooke (Fungi, p. 53 [1882]) still maintains Berkeley's error of considering these monosporous sporangia as conidia, a mistake easily detected on comparison of *Chætocladium* with the variously 1–4-spored sporangia of *Thamnidium* and *Chætostylum*.

14. *Chætocladium Brefeldii* Van Tieghem, Rech. sur les Muc. pp. 86–92, pl. 23, figs. 71–9 (1873); Bainier, *l. c.*, pp. 98–100, pl. ix. figs. 1–4 (1882).—*C. Jonesii* Brefeld, Bot. Unt. i. pp. 29–40, pl. 4 (1872).—This species is distinguished from *C. Jonesii* mainly by the size of its spores, which reach from 3–5 μ (Van Tiegh.), about 4·5 μ (Bainier), 1·8–3·3 μ (Brefeld), 3–4·5 μ (mihi); the spores are also smoother, and the whole plant more delicate.

On a filament of *Thamnidium*. Edgbaston (Wk.), December. My plant agreed exactly with Bainier's figure. (Tab. 245, f. 10).

According to Van Tieghem's experiments (*l. c.*, p. 91), the parasitism of this plant is what he calls "facultative," *i. e.*, it can live independently, but sometimes voluntarily affixes itself to another Mucorine, deriving nourishment therefrom and growing with greater robustness under such circumstances. Brefeld obtained the zygospores of this species (*l. c.*, pp. 35–6). The spores of *C. Jonesii* Fres. (*C. Fresenianum* Brefeld, Bot. Unt. iv. p. 55) vary from 6·6 to 8 μ, reaching even 10 μ.

PIPTOCEPHALIS De Bary & Wor. (1866).

Mucorine. Fertile hyphæ erect, at length coloured, repeatedly dichotomous above, alternate pairs of branches in planes at right angles to one another. Ultimate ramuli terminated by a convex head, bearing on the upper surface numerous cylindrical sporangia, the contents of each of which resolve themselves into a chain of spores, by simultaneously formed septa.

The spores of this genus, too, have been regarded as conidia, but this appears to be as much a mistake as in *Chætocladium*. The sporangial membrane is very evanescent. *Piptocephalis* is parasitic upon *Mucor*, but whether the parasitism is facultative or necessary is undecided. The colouring matter of the aërial hyphæ is arranged

‡ χαιτή long hair; κλάδος, a branch.

in narrow longitudinal bands, which impart a striated aspect to the filaments.

15. *Piptocephalis Freseniana* De Bary & Wor.; Fresenius, Bot. Zeit. p. 154 (1864); De Bary & Wor. Beitr. ii. pp. 23–4, pl. 5, figs. 17–9 (1866); Brefeld, Bot. Unt. i. p. 41, pl. 5–6 (1872); Van Tiegh. & Le Mon. Rech. sur les Muc. p. 107 (1873); Bainier, *l. c.*, pp. 110–1 (1882); Sachs, Text-book of Bot., Eng. ed. ii. p. 266, fig. 175 (1882).

Fertile stems scattered, from 6 to 8 times dichotomous above, brownish; dichotomies regularly shorter; ultimate ramuli short, diverging, each bearing a broad obconical head, the upper surface of which is grooved and mammillated. Sporangia about 4-spored. Spores shortly cylindrical, 2·6–3·3 μ broad (De Bary & Wor.), 1·8–2·3 μ (Brefeld), 4·2 μ broad (Bainie)r, 3·5–4 μ broad (mihi); about 6–7 u long (Brefeld says 3·3–5·1 μ), but varying considerably.

On horse-dung, with *Mucor*. Edgbaston (Wk.), January. Stem 1-10th inch high, or higher, with about nine septa; a septum or two at each fork of the dichotomy. The heads fall off easily with the spores, from which circumstance the generic name is derived. (πίπτω, I fall, κεφαλή, a head.) Brefeld discovered the zygospores of this species (*l. c.*, p. 48). (Tab. 245, f. 11).

(To be continued.)

REMARKS ON SOME ENDOPHYTIC ALGÆ.

By Spencer Le M. Moore, F.L.S.

The announcement by Cohn in the first volume of his 'Beiträge zür Biologie der Pflanzen,' of the endophyte to which he gave the name of *Chlorochytrium Lemnæ*, aroused general interest. Not very much more was done in this branch of botany until Georg Klebs published, in an elaborate paper in the 'Botanische Zeitung' for 1881, Nos. 16–21, his discovery of several new endophytic forms, together with a more complete account of Cohn's species than the latter was able to give to it. Klebs has given a minute account of the copulation of the zoospores of *C. Lemnæ;* this takes place while they are still enclosed in the gelatinous matter which exudes from the ruptured wall of the zoosporangium. The escaped 4-ciliated zygozoospore swims about for a while and then settles on the *Lemna* surface, whose epidermis it pierces, and arriving in the subepidermal parenchyma it grows into a zoosporangium. Cohn observed that the zoospores sometimes fail to escape from the zoosporangium, and he suggested that these might possibly be resting-spores, a supposition Klebs declares to be unfounded, for not only has he seen these zoospores die in the sporange, but he has carefully studied the winter condition of the plant, which does not greatly differ except in size from the summer state. I can confirm what Klebs says about the unescaped zoospores with this addition, that they sometimes begin to germinate in the sporange, growing out into oblong or elliptical

bodies often narrowed in the middle, and usually containing a vacuole, traces of starch, and some pale green plasma. I was at first inclined to think that these zoospore-plantlings might pierce the sporangium wall as the budding zygozoospore does the epidermis, and penetrating into the surrounding tissue give origin to the species called by Klebs *C. pallidum*, which he says is to be found in all sections of *Lemna trisulca*. As, however, I have never seen the penetration of the sporangium-wall, but frequently dead and discoloured plantlings differing only in their form and thinner wall from the ordinary rounded undeveloped zoospores, this view is probably incorrect; and I am the more inclined to think so from having met with an organism in the tissue of *L. trisulca* which answers very well to Klebs' figure and description of *C. pallidum*, and never shows any connection with *C. Lemnæ*. The copulation of the zoospores while still surrounded by the extruded gelatinous envelope I can also confirm, having followed this towards the latter part of September, at which time of year I found it to occur, as is stated by Klebs, between 7 and 8 o'clock in the morning. This copulation of zoospores from the same mother-cell is claimed by Klebs as the simplest sexual process in the vegetable kingdom. The well-known observations of Dodel-Port (Pringsheim's 'Jahrbucher für Wissenschaftliche Botanik,' x., p. 417), on *Ulothrix zonata*, led him to the conclusion that the sexual bourne is reached by microzoospores which either copulate with others or, copulation failing, reproduce themselves asexually; and perhaps this double capacity indicates the propriety of Dodel-Port's view. I think, however, that it will be admitted that there is ground for holding the sexuality of *C. Lemnæ* to be simpler than that of the other, when I add that I have found upon the object-glass, after emission of the zygozoospores, undoubtedly single uncopulated zoospores; and although I have not succeeded in following up their history, it is in the highest degree probable, seeing that the zoospores of the other species of *Chlorochytrium* are asexual, that these uncopulated zoospores can reproduce the plant.

In the 'Botanische Zeitung' for 1875 (p. 117), Kny announced the discovery of a new *Chlorochytrium* in the tissue of *Ceratophyllum demersum*. This was at length described by Kirchner, in the 'Kyrptogamen-Flora von Schlesien,' under the name of *C. Knyanum*. Klebs finds that this species occurs also in *Anacharis* and in *Lemna minor* and *gibba*. It differs from *C. Lemnæ* in having no cellulose knob attached to the zoosporangium and in the asexuality, so far as ascertained, of its zoospores. I am happy to be able to add this species to the algal flora of the country, having met with it in the Lemnas, though not in great abundance.

Another form described by Klebs, and found also by me in a pond between Mottingham and Bromley, is *Scotinosphæra paradoxa*, a guest of *Lemna trisulca* and of a species of *Hypnum*. If the round thick-walled resting-spore of this type be placed dry in water at any time from the end of May to the middle of June, changes begin in it after twenty-four hours. Its green plasma breaks up into a number of gonidial portions, which coalesce into larger

bodies, and ultimately form one large green mass lying in the sporange, surrounded by a red granular matter applied to its inner wall. The central mass then dissolves, and by a series of divisions the biciliated asexual zoospores are formed; meanwhile the red colour has vanished from the granular investment. This interesting process, which is accomplished in the course of twenty-four hours, I have not seen, my experience of the type dating only from the latter part of September of last year. But there can be no doubt as to the identification, for I have found *L. trisulca* fronds copiously studded with the curious empty granule-lined sporangia, and containing also what are evidently immature resting spores, for they agree very well with Klebs' figure, if a little allowance be made on the score of unripeness. Further, I have studied for three weeks the comportment of a few larger and angular, but similarly granule-lined sporangia, whose green plasma is in various stages of division corresponding best with Klebs' figures 59 *c* and 59 *g*. During the whole period of observation the contents of these sporangia have remained without the slightest apparent alteration; there is reason to suppose, therefore, that their development has been arrested by unfavourable conditions. The granular lining of the sporangia is a very striking feature of this species. Forms referable to Klebs' two other genera *Phyllobium* and *Endosphæra* I have not yet succeeded in finding.

Klebs has some interesting remarks on the classification of these organisms. He speaks of their similarity to *Synchytrium* —a similarity pointed out by Cohn in his original memoir—but without endorsing Cohn's questionable opinion that *Chlorochytrium* is a link between Algæ and Fungi. It seems to me that the flagellate zoospores of *Synchytrium* render its comparison with *Chlorochytrium* very unreliable, in spite of certain obvious resemblances between the two. I would also remark that *Protomyces* presents more than one analogy to *Chlorochytrium*. Klebs is of opinion that our group must range with *Protococcaceæ*, in which its place is next to *Hydrodictyeæ*, a conclusion few, if any, will feel disposed to challenge; still, the inseparation of the zoospore-brood of each mother-cell of the latter group places a certain barrier between the two. *Apiocystis*, which will probably prove little more than an epiphytic form of *Chlorochytrium*, is perhaps nearer than *Hydrodictyeæ*. *Botrydium* is also noted by Klebs as showing much resemblance to the endophytic type he calls *Phyllobium dimorphum*, and which he thus considers to be a form of transition between *Siphonaceæ* and *Protococcaceæ*.

PTILOPTERIS, NOVUM *POLYPODIACEARUM* GENUS.

Auctore H. F. Hance.

Sorus rotundatus, exindusiatus. terminalis in apice haud incrassato nervi singuli. Petiolus rhizomati continuus. Filices cæspitosæ, foliis pinnatisectis, paleis cystopteroideis præditæ, Japoniæ et Sinæ incolæ.

Generis, meo sensu, admodum naturalis, a cunctis *Aspidiis* veris (inclusis *Phegopteridibus*) sororum situ terminali optime distincti, duæ tantum hucusque mihi certe innotuerunt species: has inquam.

1. **Pt. Hancockii,** sp. nov,—Cæspitosa, foliis tenuiter coriaceis in sicco olivaceis glaberrimis petiolo 8–pollicari sordide stramineo paleis paucis setaceis pallidis hinc inde tecto lamina 8–pollicari lanceolata acuminata præter segmentum utrumque infimum $2\frac{1}{2}$ pollicare iterum pinnatisectum simpliciter pinnatisecta segmentis numerosis approximatis patenti-divergentibus 5–9 lin. longis 2 lin. latis breviter petiolatis e basi inferiore dimidiato-cuneata apicem versus tantum dentata superiore auriculata trapezio-ovata ovato-lobulata lobulis setaceo-mucronatis postico nunc subdistincto nervis semel furcatis, soris ad rami antici apicem sitis margini potius quam costulæ excentricæ approximatis.

In dorso montium juxta Tam-sui, ins. Formosæ, alt. 3500 ped., d. 11. Dec. 1881, rarissimam invenit am. W. Hancock. (Herb. propr. n. 22229).

2. *Pt. Maximowiczii* (= *Polypodium* Baker !)

In monte Kund-sho-san, Japoniæ (Maximowicz n. 17*b*.)

Hæcce, inter alia, eximie differt foliorum, apice radicantium, forma, segmentorum omnium simplicium, deflexorum, forma atque incisura, sorisque submarginalibus.

Pace honoratissimi Baker, me judice, nil habet commune cum *Aspidio repente* Mett., nec cum speciebus huic intime affinibus. Vera affinitas *Phegopteridis obscuræ* Fée, *Ph. caudatæ* Fée, aliarumque, adhuc minime certa. An nostratium congeneres ?

FERNS COLLECTED IN MADAGASCAR BY M. HUMBLOT.

By J. G. Baker, F.R.S.

The following is a list of the ferns contained in the set which we have received of a fine collection of plants made lately in the north-east of Madagascar by Mons. L. Humblot. I do not know the exact geographical limits within which they were obtained, but they are evidently more tropical types than the three sets I have already described, those of Miss Helen Gilpin and of Messrs. Pool and Kitching.* The unenclosed figures are M. Humblot's collecting numbers; those within brackets indicate the position of the new species according to our 'Synopsis Filicum.'

278 (3*). **Cyathea serratifolia,** n. sp. — Frond ample, bipinnate, firm in texture, green and quite glabrous on both surfaces, naked on the rachises beneath. Pinnæ oblong-lanceolate, reaching a length of $1\frac{1}{2}$–2 ft. and a breadth of 7–8 in. Pinnules lanceolate,

* Since this was written we have received the ferns gathered by the late much-lamented Dr. Hildebrandt, which have been determined by Dr. Kuhn. This collection includes about seventy species, a few of which are novelties.

patent, distinctly petioled, 4–4½ in. long, ½–⅝ in. broad, acuminate, subdeltoid at the base, distinctly serrulate towards the tip, subentire or obscurely crenate below. Veins close, distinct, rather ascending, mostly 2–3-furcate from the base or near it. Sori costular, subcontiguous. Indusium large, brown, glabrous, moderately firm in texture, breaking up irregularly. A very distinct novelty, in cutting and texture most resembling the well-known *Alsophila Tœnitis* of Brazil.

295. *C. canaliculata* Willd.

299 (34*). **C. ligulata,** n. sp.—Frond ample, bipinnate, moderately firm in texture, green and glabrous on both sides of the lamina, but the rachis both of the frond and pinnæ clothed with short hairs mixed with a few small linear dark brown paleæ, and midrib of the pinnules beneath also shortly hairy and paleaceous. Pinnæ lanceolate, reaching 1¼–1½ ft. long and a breadth of 2½–3 in. Pinnules contiguous, patent, ligulate, quite sessile, but only a few of the uppermost adnate at the base to the rachis, 1–1½ in. long, ¼ in. broad, entirely or distinctly crenate. Sori crowded, costular. Indusium a large cup of firm texture with a regular truncate mouth. A near ally of *C. canaliculata*.

262 (34*). **C. hirsuta,** n. sp.—Frond ample, bipinnate, moderately firm in texture, green on both surfaces, very hairy but not scaly on the rachis of pinnæ beneath, slightly hairy on the under, glabrous on the upper surface of the lamina. Pinnæ lanceolate, 9–12 in. long, 1½ in. broad. Pinnules close, patent, ligulate, all adnate to the rachis, ¾–⅞ in. long, 1-6th to 1-5th in. broad, obtuse, obscurely denticulate. Sori crowded, costular. Indusium fragile, membranous, breaking up irregularly. An ally of *C. canaliculata*.

264 (33*). **C. Humblotii,** n. sp.—Frond ample, bipinnate, moderately firm in texture, green and glabrous on both surfaces, the rachises neither at all hairy or scaly on the under side. Pinnæ oblong-lanceolate, reaching a length of 2 ft. and a breadth of 9–10 in. Pinnules lanceolate, ¾–⅞ in. broad, cut down throughout to the midrib into contiguous rather ascending subentire ligulate obtuse tertiary segments ⅙ in. broad; those of the fertile frond narrower and not so close as in the sterile. Veins fine, moderately close, mostly forked at or near the base. Sori crowded, filling up the whole surface of the fertile segments. Indusium membranous, fragile, breaking up irregularly. A near ally of the well-known Mauritian *C. excelsa* Sw.

560. *Hymenophyllum ciliatum* Sw.

280, 451. *Trichomanes rigidum* Sw.—Two different varieties.

412. *Dicksonia Henriettæ* Baker.

308. *Davallia calobodon* Mett.—This I incline to place as a variety of the Asiatic *D. strigosa* Sw.

292. *D. pedata* Sw.

261. *D. mauritiana* Hook.—This I now incline to look upon as a variety of *D. elegans* Sw.

285. *D. Goudotiana* Kunze.

430 (70*). **D.** (Stenoloma) **odontolabia,** n. sp.—Forms a dense mass with the habit of a *Hymenophyllum*. Rhizome filiform, wide-

creeping, with only a few minute ferruginous hair-like paleæ. Stipe reaching 1 in. in length, castaneous, quite naked. Lamina lanceolate, 1½–3 in. long, ¼–½ in. broad, green, glabrous, almost membranous in texture, pinnatifid throughout, narrowed gradually into the stipe or cut down a filiform midrib in the lower half. Upper primary segments very short, ligulate, erecto-patent, 1-veined; lower deltoid, ⅛–⅙ in. broad at the tip, with 2–4 dichotomous veins. Indusium marginal, of two large unequal membranous toothed subquadrate valves. A very distinct species, most resembling in habit the American *Hymenophyllum asplenioides*.

259 (71*). **D.** (Odontoloma) **decomposita,** n. sp. — Stipes tufted, naked, fragile, castaneous, 3–4 in. long. Lamina deltoid, decompound, 4–6 in. long, dark green, glabrous, moderately firm in texture. Pinnæ crowded, imbricated, the lower two or three pairs the largest, deltoid, ¾–1 in. broad. Tertiary segments distant, the upper simple, erecto-patent, the lower forked or sparsely pinnate. Final segments 1-nerved, 1-12th in. long, ¼–⅓ lin. broad, lax, erecto-patent, narrowed gradually from the tip to the base. Indusium terminal, of two short membranous glabrous toothed green valves. A near ally of the Brasilian *D. bifida* Kaulf.

495 (13*) **Lindsaya leptophylla**, n. sp. — Rhizome slender, wide-creeping, epigæous, castaneous, with only a few small linear brown paleæ. Stipes distant, rigid, fragile, glabrous, naked, nearly black, 6–8 in. long. Lamina lanceolate, 1 ft. long, 2–3 in. broad, bright green, membranous, glabrous, similar in texture and veining to the thinner-fronded Adianta, as *A. trapeziforme* and *A. macrophyllum*. Pinnæ subquadrate, laxly disposed, shortly petioled, dimidiate and entire on the posterior and inner margins, deeply irregularly lobed on the two others, the apex truncate or lengthened out, the final lobes rounded, 1-12th to 1-8th in. broad. Veining distinct, flabellate, free. Indusium of two equal narrow membranous spreading glabrous valves. A most distinct and handsome novelty, in habit most recalling *Adiantum caudatum*, but the pinnæ most like the final segments of *A. trapeziforme* in shape and size.

312. *Pellæa hastata* Link.

263. *Lonchitis madagascariensis* Hook.

284. *L. occidentalis* Baker. — An interesting addition to the Madagascar flora, as before it was known only on the west side of the African continent, in Angola and Guinea.

256. *Pteris phanerophlebia* Baker.—This, which was first gathered not long ago by Curtis, has now been found both by Humblot and Baron.

266. *P. quadriaurita* Retz.

274. *Ceratopteris thalictroides* Brong.

529. *Lomaria attenuata* Willd., var. *gigantea*.

307 (8*). **L. simillima,** n. sp.—Rootstock thick, woody, widescandent. Stipes of both kinds 3–4 in. long, with a few minute linear brown paleæ. Barren lamina oblong-lanceolate, about a foot long, 5–6 in. broad, moderately firm in texture, green and glabrous on both surfaces. Pinnæ 10–12-jugate, lanceolate, entire,

acuminate, adnate by a broad base, ½–⅝ in. broad, the central ones the longest (3–3½ in.), the lowest reduced to 1–1½ in. Veins fine, close, indistinct, erecto-patent. Fertile pinnæ narrow linear, 4–5 in. long. A very near ally of the American *L. Plumieri*.

305 (18*). **L. stenophylla,** n. sp. — Rootstock thick, woody, wide-creeping. Paleæ rigid, horny, lanceolate-acuminate. Barren frond sessile, lanceolate, rigid in texture, green and glabrous on both surfaces, 9–12 in. long, ½ in. broad, with a long entire point, cut down below the point to the rachis into obtuse entire broad oblong or semiorbicular lobes, growing gradually smaller towards its base. Fertile frond with only a few very minute distant pinnæ in the lowest 3–4 in., produced at the point into a long entire tail (3–4 in. long), the central pinnæ linear, 1–1½ in. long.

257, 442 (25*). **L. xiphophylla,** n. sp.—Rootstock and basal paleæ not seen. Barren lamina oblong-deltoid, moderately firm in texture, green and glabrous on both surfaces, 15–18 in. long, 9–10 in. broad, with a naked rachis, simply pinnate. Pinnæ lanceolate, entire, acuminate, ¾ in. broad, the upper ones broadly adnate, the lower narrowed from the middle to the base, sessile, with a rounded base. Veins fine, close, distinct, ascending. Pinnæ of the fertile frond linear, 5–6 in. long. A near ally of the American *L. acuta* Desv. (*L. cuspidata* Kunze).

543. *L. biformis* Baker.
317. *Asplenium Poolii* Baker.
314. *A. oligophyllum* Kaulf.
318. *A. falcatum* Lam.
267. *A. macrophyllum* Sw.
287. *A. resectum* Sm.
294. *A. bipartitum* Bory.
282. *A. hirtum* Kaulf.
288. *A. cuneatum* Lam.

260, 283, 289, 320, 322, all forms of *A. affine* Sw., and 276 my var. *tanalense*, which is *A. simillimum* Kuhn, whilst his *A. viviparoides* is what I have regarded as a dareoid form of this species.

323. *A. decussatum* Sw.
296. *Nephrodium subbiauritum* Hook.

272. **N.** (Lastrea) **ochrorachis,** n. sp.—Stipes densely tufted, slender, fragile, stramineous, 6–7 in. long, clothed throughout with small scattered adpressed lanceolate brown paleæ, which extend to the rachis. Lamina oblong-lanceolate, bipinnate, ½ ft. long, 3–4 in. broad, thin in texture, green and glabrous on both surfaces. Pinnæ lanceolate, patent, 1½–2 in. long, ½–⅝ in. broad, cut down to the rachis into adnate obtuse ligulate rather ascending entire or obscurely dentate pinnules ⅛ in. broad; lower pinnæ deflexed, not much dwarfed. Veins simple, erecto-patent, 6–7-jugate, distinct. Sori small, supra-medial on the veins. Indusium minute, glabrous. A near ally of *N. gracilescens* and *chrysolobum*.

265 (153*). **N.** (Lastrea) **magnum,** n. sp. — Fronds ample, deltoid, tripinnate, moderately firm in texture, green and glabrous on both surfaces; rachis of the pinnæ and pinnules minutely paleaceous; paleæ linear-subulate. Pinnæ oblong-lanceolate,

reaching a length of 15–18 in., 6–7 in. broad. Pinnules lanceolate, ¾–1 in. broad; tertiary segments adnate, lanceolate, ⅙ in. broad, obtuse, inciso-patent, with contiguous erecto-patent oblong lobes. Veins simple in the upper, forked in the lower 4-nary lobes. Sori medial on the veins, one opposite each final lobe, 15–20 to each fully-developed tertiary segment. Indusium glabrous, moderately firm and persistent. Allied to *N. effusum* and *N. Boivini*.

281. *N. truncatum* Presl.

309 (213*) *N.* (*Sagenia*) *Lawrenceanum* (Moore in Gard. Chron., n. s., vol. xv. (1881), p. 8, under *Sagenia*).—A very fine plant, introduced lately into cultivation through Messrs. Sander & Co., of St. Albans. It comes midway between *N. Pica* and *N. macrophyllum*, and has a black shining rachis and stipe, large deeply pinnatifid lower pinnæ above a foot long, large sori in regular rows parallel with the main veins and copious distinct areolæ, with abundant free included veinlets.

319. *N. cicutarium* Baker.

279. *Didymochlæna lunulata* Desv.

277. *Nephrolepis acuta* Presl.

525. *Oleandra articulata* Cav.

447 (297*). **Polypodium** (Phymatodes) **inconspicuum**, n. sp. —Rhizome thread-like, wide-creeping, hypogæous. Frond linear, simple, coriaceous, glabrous, naked, 1½–2 in. long, ⅛–⅙ in. broad, narrowed gradually into a short stipe, obtuse. Veins reticulated, quite hidden in thick substance of the frond. Sori oblong, distant, superficial, parallel with the midrib and margin, not more than 5–6 on each side of the midrib. Allied to *P. subecostatum* and *accedens*.

341. *P.* (*Drynaria*) *Willdenovii* Bory.

666. *P. Phymatodes* L. or a near ally.—Like a new species, but our specimen is not good enough to be sure about.

273, 306. *Vittaria elongata* Sw.

291. *V. lineata* Sw.

269. *V. scolopendrina* Thwaites.

515, 665. *Antrophyum coriaceum* Wall.

268. *A. Boryanum* Kaulf.

310. *Tænitis niphoboloides* Luerssen.—This very curious species was previously only known by a specimen in the Rutenberg collection.

568 (19*). **Acrostichum** (Elaphoglossum) **subsessile**, n. sp. —Rootstock thick, woody, short-creeping; its paleæ brown, lanceolate, membranous. Barren lamina lanceolate, entire, 1½–2 ft. long, 2–2½ in. broad at the middle, narrowed gradually to the base and apex, nearly sessile, moderately firm in texture, green and naked on both surfaces. Veins fine, close, indistinct, ascending. Fertile frond oblanceolate, acute, under 1 ft. long, under 1 in. broad, narrowed gradually from the middle to a stipe 3–4 in. long. A near ally of *A. latifolium* Sw.

270. *A. latifolium* Sw.

297. *A. spathulatum* Bory.

286, 528. *A. sorbifolium* L.

258. *A. punctulatum* Sw.

300 (122*). **A.** (Chrysodium) **Humblotii,** n. sp.—Rootstock and fertile frond not seen. Sterile lamina oblong-deltoid, simply pinnate, 15–18 in. long, 8–9 in. broad, prolonged into a flagelliform rooting tip, moderately firm in texture, green and naked on both surfaces, the rachis also quite naked. Pinnæ 6–8-jugate, entire, lanceolate, acuminate, 1–1½ in. broad, the upper adnate and decurrent at the base, the lower free but sessile; several lower pairs subequal. Allied to *A. punctulatum* and *Blumeanum*.

395. *A. aureum* L.
293. *A. spicatum* L.
654. *Osmunda regalis* L. var.
169. *Lygodium lanceolatum* Desv.
271. *Schizæa dichotoma* Sw.
546. *Angiopteris erecta* Hoffm.
275. *Marattia fraxinea* Sm.
333. *Ophioglossum pendulum* L.
311. *Lycopodium Phlegmaria* L.
290. *L. gnidioides* L.
389. *L. carolinianum* L.
304. *Selaginella lævigata* Baker.
487. *S. fissidentoides* Spring.
350. *Salvinia hastata* Desv. = Baron, 1569.

MASSON'S DRAWINGS OF SOUTH AFRICAN PLANTS.

By James Britten, F.L.S.*

The history of these drawings is given in the 'Journal of Science and Arts,' iv. 199 (1818), and runs as follows:—

"Mr. Francis Masson, the late intelligent and industrious collector of plants, while employed in 1775, at the Cape of Good Hope, in procuring supplies for the Kew Gardens, unexpectedly met with, among the Dutch soldiers who then guarded that colony, an artist of great skill as a designer of the objects of natural history. Availing himself of the circumstances, he formed a considerable portfolio of coloured drawings of the samples of the more curious objects of his pursuit, and especially of such as he deemed most refractory to exotic transplantation. They have been since added, by Sir Joseph Banks, to those treasures so long regarded throughout the world, to their possessor's and our country's honour, as the best funds of Science." Many of these drawings, mostly endorsed in Sir Joseph Banks's hand, "Mr. Masson, Cape of Good Hope, 1775," are now in the Department of Botany, British Museum; and, as they present some points of interest, I propose to give some account of them.

In his preface to 'Stapelieæ Novæ,' Masson certainly leaves it to be inferred that he himself drew the figures. He says:—"In my

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* See p. 123.

various journeys through the deserts I have collected about forty, and these I humbly present to the lovers of Botany. The figures were drawn in their native climate, and though they have little to boast in point of art, they possibly exhibit the natural appearance of the plants they represent better than figures made from subjects growing in exotic houses can do." Only two of the drawings for this volume are in the British Museum: *Stapelia ciliata* (tab. 1), of which Masson writes "In loco natali delineata 1774"—a remark which he adds to none of the other descriptions, most of which were founded on plants grown in his garden at the Cape—: and *S. Gordoni* (tab. 40), which is not endorsed by Banks, but bears on its front the name "Webber" in Dryander's hand: another figure, apparently of some undescribed Apocynaceous plant, bears a note by Dryander—"Webber, copied from a drawing of Captain Gordon's at the Cape of Good Hope."* Captain (or, as he is there styled, Colonel) Gordon is referred to by Masson in his preface as having "discovered some very remarkable species." Of the *Stapelia*, to which his name was assigned, Masson says, "Hanc unicam speciem Stapeliæ nec vidi nec examinavi; exemplar, ex quo delineatio concinnata est, acceptum refero favori Dni. Gordon." The published figure differs in colouring from the drawing, the latter containing no indication of the purple hue assigned to the buds in the former.†

The drawings of Orchids, from which the figures enquired for by Mr. N. E. Brown (Gard. Chron., Feb. 9th, 1884, p. 184) were taken, are all in the collection. Plate vi. in 'Journ. Science and Arts,' iv. (1818) contains figures of *Disa grandiflora*, *D. spathulata* and *Bartholinia Burmanniana*, and is interesting as an early example of lithography. A note appended to the descriptions runs thus:—"This plate [was] printed at the Lithographic Press of Messrs. Moser and Harris, 71, Cromer-street, Brunswick-square. When it is considered that, by this art, drawings are multiplied to any extent, without either the expense or the labour of engraving, there can be little doubt but that it will in a short time be much more generally adopted in this country. . . . . Mr. Moser, who has just set up two presses in this country, was for some time employed at several of the most considerable lithographic establishments on the Continent." In vol. v. of the same Journal are descriptions and figures, "derived from the same source as those of the others" of *Disa porrecta*, *Disperis capensis*, and *D. secunda*; in vol. vi., of *Disa graminifolia* (*Herschelia cœlestis* Ldl.), *Disperis villosa*, *D. cucullata*, *Corycium bicolor*, and *Pterygodium catholicum*; in vol. viii., of *Satyrium bracteatum*, *Pterygodium alatum*, and *Corycium orobanchoides*; and in

* This copy is identical with a plate (lettered 'Pentandra Monogynia') facing p. 124 of Paterson's 'Narrative of four Journeys into the country of the Hottentots' (1789), and the latter was no doubt prepared from Gordon's original drawing. Gordon travelled into the interior in 1774, and again (with Paterson) in 1777—1779. Our drawing of *S. Gordoni* is probably also a copy.

† I should have thought it impossible that Bot. Mag., t. 6228, could have been intended to represent Masson's plant; but Mr. N. E. Brown assures me that such is the case.

vol. ix., of *Pterygodium volucris* and *P. inversum*. On all these drawings, save the last two, is a note in Robert Brown's hand, "returned April 11, 1820," the words "by Mr. Ker" being added in two instances. This last fact is of some interest, inasmuch as, although the series of papers which these plates illustrate is correctly attributed to Ker, his name does not appear in connection with any one of them, while in the Royal Society's 'Catalogue of Scientific Papers' they are assigned to Masson. All the Orchid drawings have been seen by Prof. Reichenbach, and bear names in his handwriting. The names given above are accepted by him, with four exceptions: the plant figured as *Corycium bicolor* is named by Prof. Reichenbach *C. crispum* Sw.; *Pterygodium catholicum*, which is referred by him to the allied *P. cruciferum* Sond.; *Bartholinia Burmanniana*, which he names *B. pectinata;* and *Satyrium bracteatum*, which he queries as *S. striatum* Thunb. A list of them was given by Lindley in Bot. Reg. (tt. 700–703), who says "The original drawings are in Mr. Brown's library."

There are several drawings of *Iridaceæ*, mostly species of *Moræa*, four of which were reproduced by Ker in the 'Botanical Magazine,' and have been named by him. These are *Moræa angusta* (Bot. Mag., t. 1276), *M. crispa* (Id., t. 1284), *M. spicata* (Id., t. 1283), and *Aristea melaleuca* (Id., t. 1277); Ker (or Gawler, as he then was) acknowledges his indebtedness to Sir Joseph Banks "for his very liberal permission to copy the original drawings" of these plants (Id., t. 1276). The last-named plant is of special interest, as it is the type of Salisbury's genus *Cleanthe* (Trans. Hort. Soc. i. 312), a genus retained by the authors of the 'Genera Plantarum,' who say of it: "Species 1, Africæ australis incolæ, a nobis non visa. *Thunb. Diss. Moræa* t. 1 (*Moræa melaleuca*). *Bot. Mag.* t. 1277 (*Aristea*). Genus non nisi ex his iconibus et descriptionibus notum, dubium remanet." Masson's specimens, however, exist in the British Museum Herbarium: Salisbury says it flowered at Kew in 1788, and that he received seeds of it, which germinated freely, in 1811; since that date the plant seems to have been lost sight of. There are also drawings of *Moræa Pavonia*, *M. tristis*, *M. tripetala*, *M. papilionacea*, *M. edulis*, *M. ciliata*, *Galaxia ovata*, and *Ferraria undulata*.

The drawings of four species of Mesembryanthemum—*M. pinnatifidum*, *M. corallinum*, *M. ciliatum*, and *M. digitiforme*—are also of interest. Of all but the last of these—as indeed of nearly all the plants figured—we have Masson's specimens in the British Museum. In Harvey's 'Flora Capensis' and elsewhere the names of the last two are attributed to Thunberg, who published them, with nineteen other species, in a paper 'Descriptiones Mesembryanthemorum' appended to vol. viii. of the 'Nova Acta Ephemerides.' This volume is dated 1791; but in Aiton's 'Hortus Kewensis' (1789) we find the same plants, one, *M. ciliatum*, bearing the same specific name; the other, *M. digitiforme* Thunb., called *M. digitatum*. A reference to the Solander manuscripts shows that the MS. description of the latter was quoted by Solander from Thunberg's MSS., and that Thunberg's specific name was pur-

posely modified by him : it is, however, quite clear that Solander's name was the earliest published, and the species must therefore stand as *M. digitatum* Ait., *M. digitiforme* Thunb. ranking as a synonym. The species is said by Harvey to be "now wanting in Herb. Thunb."; and, from its absence from Herb. Brit. Mus., and the fact that Solander's MS. description was copied from Thunberg, I suppose that Masson himself did not preserve dried specimens of it.* The species does not seem to have been since met with, and no figure has been published, so that the drawing, bearing as it does the name "*Mesembryanthemum digitiforme* MSS." in Solander's hand, is practically the type of the species, which is not in the Kew Herbarium.

M. ciliatum Ait. (1789), Thunb. (1791) is remarkable for the long deflexed hairs which ciliate the bases of the leaf-sheaths; a peculiarity which induced Haworth (Syn. Pl. Succ. 256, 1812) to "doubt its belonging to this genus." Harvey describes it from Thunberg's specimens, and gives no other authority for its occurrence at the Cape. But in Herb. Brit. Mus. are three specimens from Masson, the locality for which, in Solander's MS. description, is somewhat differently expressed from that given by Thunberg: it runs, "Habitat in locis depressis infra bockland berg et in Haudtom ad Prom: b. Spei." Possibly, however, the specimens are really from the same locality, as Thunberg and Masson made two journeys into the interior together. It is greatly to be regretted that the 'Flora Capensis' only occasionally includes references to the collections of Banks, Robertson (1774), Masson, Auge, Nelson, Oldenburg, Lind, and others, all of which are in the British Museum.

The remaining drawings are *Monsonia lobata* and *M. speciosa*, both introduced to cultivation in this country by Masson; *Melasma scabrum*; *Calodendron capense*; *Rothmannia capensis*; *Hyobanche sanguinea*; *Vahlia capensis*; *Euphorbia meloformis*; *Augea capensis*; † *Harveya capensis*; *Ornithoglossum glaucum*.

With the above is a drawing, "sent from the Cape of Good Hope by Mr. Brant, 1772," of the remarkable *Gethyllis undulata*—a plant which Herbert (Amaryllidaceæ, 186), who described it, says was then "only known from Masson's specimen" in Herb. Banks—a statement which apparently still holds good, as the species is

* It would appear, however, from 'Hort. Kew.' ii. 181, that Masson sent living plants to Kew: its record runs, "Cape of Good Hope. Mr. F. Masson. Introd. 1775."

† No figures, so far as I can ascertain, have been published of this interesting plant, which Solander named and described in his MSS. as *Piotes teretifolia*. Harvey (Fl. Cap. i. 355) says of the generic name "unexplained by Thunberg," and gives no explanation of it. It commemorates Andrew Auge, a Cape collector contemporary with Thunberg and Masson, whose plants are, as previously stated, in Herb. Mus. Brit. Thunberg gives the following account of him:—"Auge, Andreas, Germanus et Hortulanus in Horto culinario Societatis, plures annos vitam heic transegit et jussu Gubernatoris Tulbagh, plurima itinera ad interiora regionis loca, plantas colligendi caussa, instituit. Ex ejus iteratis collectionibus ditati fuerunt Horti botanici foederati Belgii, imprimis Amstelædamensis et Leidensis, nec non herbaria europæa, maxime Burmanni, Royeni, Linnæi, Bergii, aliorum."—Fl. Cap., 3, 4.

not represented in the Kew Herbarium. Herbert describes it from leaves only, but Brant's figure shows the fruit. Solander, in his MSS., wrote a very full description of the plant under the name of *Gethyllis polyanthera*—a name also appended to the drawing; he, however, subsequently identified it with *G. ciliaris* Thunb. Masson's fragmentary specimens of the latter plants are insufficient for comparison; but Solander appears to have had a living specimen from which to draw up his description, which contains copious details which neither Masson's specimens nor Brant's drawing could have supplied. So little is known of the plant that it seems worth while to print Solander's account of it, which, it must be remembered, was written of his *polyanthera* (*undulata* Herb.) before the identification of this with *ciliaris* had been made.

"*Spatha* radicalis, monophylla, ovata, acuminata, uniflora, germen involvens. *Corolla* monopetala, alba, hypocrateriformis. *Tubus* cylindraceus, crassitie pennæ gallinæ, biuncia longior. (Obs. Videtur spatio vix semiunciali ab ore cavus, dein consolidatus, sed forsitan nectare glutinoso exsiccato). *Limbus* sexpartitus: *laciniæ* oblongæ, acutæ, patentes, sesquiunciales. *Filamenta* sex, ore tubi ad basin laciniarum corollæ insertæ, subulata, plana, brevia, sesquilineam longa, apice divisa in lacinulos pedicelliformas. *Antheræ* quinque in singulo filamento, breviter pedicillatæ, lanceolatæ, quatuor lineas longæ, spiraliter contortæ. *Germen* inferum, oblongum, pedicellatum. *Stylus* filiformis; altitudine antherarum, crassiusculus, erectus, paulo infra orificium tubo uberus dein videtur ac si cum tubo connatus esse. *Stigma* simplex. *Bacca* cylindraceo-clavata, crassitie digiti, basi attenuata ibique crassa, tres vel quatuor uncias longa, lutea, trilocularis, epidermide tenui membranaceo pellucido tecta; e seminibus maculato-punctata; *pulpa* viscosa, lutea. *Semina* numerosa, subrotunda, parum compressa, magnitudine seminis sinapios minoris. *Obs.* Fructus ab incolis colligitur ob odorem fragrantem."

There are two or three other drawings of Cape plants which were placed with those above described, but they are by a different artist, and there is nothing to connect them with Masson, One of these is the figure of *Aponogeton distachyon*, reproduced in Bot. Mag., t. 1293; in the letterpress of t. 1292 (*Galaxia graminea*) Ker says, "For the drawing of the present plant, as well as of *Melanthium monopetalum* and *Aponogeton distachyon*, we are obliged to the kindness of Sir Joseph Banks, for whose library the original drawings were made." I do not, however, find the originals of either the *Galaxia* or the *Melanthium*.

It will, I think, be clear from the foregoing account that, while the drawings sent by Masson to Banks are still readily accessible, the original drawings of the 'Stapelieæ Novæ' are, with two exceptions, not to be traced. It seems likely that they went to Mr. Lee, of Hammersmith, whose Massonian collection, as I said in my former paper on Masson, cannot now be found.

SHORT NOTES.

Huntingdonshire Plants.—In continuation of Mr. Fryer's list of Huntingdonshire plants not recorded in 'Topographical Botany,' the following have been observed by my brother (Rev. E. F. Linton) or myself. I have added a few either observed by the Rev. N. B. Young, of Tilbrook, or contained in a collection in the possession made by the late Mr. P. Fernie:—*Myosurus minimus* L. About Buckden, E. F. L.—*Helleborus fœtidus* L. Between Diddington Lodge and wood, E. F. L.—*Nasturtium siifolium* Reich. Between Stirtloe and Buckden, E. F. L.—*Scleranthus annuus* L. Below Stirtloe, W. R. L.—*Geranium pyrenaicum* Burm. Lane between Brampton and R. Ouse, W. R. L.—*Trifolium hybridum* L. Common on turfy waysides about Stirtloe and towards Brampton Wood, E. F. L.—*Alchemilla vulgaris* L. Molesworth, N. B. Y.—*Rubus thyrsoideus* Wimm. Copse between Stirtloe and Buckden Wood, W. R. L.—*R. Radula* Weihe. Common about Buckden and towards Graffham, W. R. L.—*Rosa tomentosa* Sm. Near Diddington Wood, W. R. L.—*R. rubiginosa* L. Buckden and Diddington, W. R. L,—*R. canina* v. *tomentella*. By Diddington Wood, W. R. L.—*Serratula tinctoria* L. Honey Hill, Tilbrook, N. B. Y.; Lord Overstone's Cover, E. F. L.—*Inula Helenium* L. Gaynes; Stowe, P. Fernie.—*Picris hieracioides* L. Above Offord Darcy and below Buckden, W. R. L.—*Crepis taraxacifolia* Thuil. Buckden Wood, E. F. L. This only appeared one year, and has not been seen since.—*Campanula rotundifolia* L. Ditch-side, St. Neot's; common, W. R. L.—*Epipactis latifolia* Auct. Honey Hill, N. B. Y.—W. R. Linton.

New Localities for Rare Mosses.—*Tortula Vahlii*. Cherryhinton, Cambridge (1882). Only recorded hitherto twice in England and once in Ireland.—*Ceratodon conicus* Lindb. Dalwhinnie, Inverness (1883). In fruit; only recorded hitherto, in the barren state, once from Newhaven and once from Ireland.—*Catharinea angustata* Brid. Wickham Bishops, Essex (1884); barren. The only records are Hurstpierpoint and Doune.—*Campylopus atro-virens* var. *falcatus* Braithw.—Loch Coruisk, Skye (1883); barren. The only locality given by Dr. Braithwaite is Connemara.—*Didymodon cylindricus* Schimp. Kintail, Ross (1883). In fruit; this is, I believe, very rare in fruit.—*Fissidens exilis* Hedw. Great Houghton, Northamptonshire (1884).—*Zygodon viridissimus* Brid. Great Houghton, Northamptonshire (1884). In fruit.—*Tortula latifolia* Bruch. Wickham Bishops, Essex (1884). In fruit.—*Neckera complanata* Schimp. Woods, Yardley Chase, Northamptonshire (1884). In fruit.—The first five have been submitted to Dr. Braithwaite, who kindly named them for me.—H. N. Dixon.

Centaurea Jacea L. in East Sussex.—Nearly twenty years ago I met with the true *C. Jacea* growing in a meadow near the rectory at this place (Guestling), but supposed it only a strange variety of *C. nigra* simulating *C. Jacea*. In 1876 I again met with the plant growing in another meadow near the former station, and sent a

specimen to Mr. F. C. S. Roper, who, on acknowledging the receipt of the specimen, told me he considered it true *C. Jacea*, and, on forwarding a piece to Mr. W. B. Hemsley, at Kew, he confirmed the determination. Last year, on July 7th, I met with several plants in a meadow in the neighbouring parish of Fairlight, and begin to think that it may not be so rare as I had imagined. In fact, it is extremely liable to be overlooked, for it is so like *C. nigra* that at a short distance the radiant flowers would alone call attention to it. I may mention that the radiant form of *C. nigra* scarcely occurs here. Besides this, all the plants that I have seen were little more than a foot and a half in height, and hence scarcely showed among the standing grass.—E. N. Bloomfield.

Mespilus germanica L. in Sussex.—This tree has the appearance of being truly indigenous near Hastings. It is found here and there in woods and hedges, these latter being very different from the ordinary quickset farm hedges. They are apparently the trees and shrubs which were left as boundaries to the fields when the original forest was cleared for cultivation. These hedges consist of oak, birch, hazel, sallow, maple, hornbeam, &c., there being very rarely any whitethorn or any trace of a planted hedge. I have seen several old stocks of *Mespilus* in the large wood at the back of the rectory, and have observed it in several places in the native hedges mentioned above; and I believe it is pretty generally distributed throughout this district. There are specimens in Mr. Borrer's herbarium from three different localities all near Hastings. Sir J. E. Smith ('English Flora,' ii. 360), says, "About Ashburnham, Sussex, truly wild, Rev. J. Davies"; and adds, "Thorny in a wild state . . . the thorns disappear by culture, though I have noticed them on foreign wild specimens, and Mr. Davies observed them in Sussex." Our Medlars here are beset with thorns. Mr. J. H. A. Jenner informs me that he is acquainted with several localities for the medlar, two at Battle, one at Netherfield, and one at Ashburnham; and adds, "All the bushes I have seen are spinous; they are difficult to find unless in flower, and I have never searched them."—E. N. Bloomfield.

Potamogeton nitens in Wales.—In Dawson Turner's 'Correspondence of Dr. Richardson,' pp. 237—246, is published a very interesting letter from Richardson to Sherard, giving directions to find rare Welsh plants, especially those growing about Snowdon and the Glydyr. The original letter is preserved in the Dillenian Collection at Oxford, and is dated May 7th, 1726.* When I first saw it I took it to be *P. nitens*, and Mr. Arthur Bennett, who has seen the plant, confirms my opinion. A specimen from the same place is also in the Sherardian Collection. *P. nitens* is unrecorded for Wales; and these specimens show that it was found there nearly 130 years before any printed record was made of it as a British plant. On October 8th of the same year, Dillenius wrote

* Nicholls had suggested it was written in 1818; Dawson Turner supplied the date as April 1, 1726, a date not far from the truth.

to Dr. Richardson the letter (printed at pp. 252—264 of the work quoted), giving many particulars of their journey, and enumerating their principal discoveries; many of these have the modern names added as footnotes, but among those not identified is a "Potamogeton foliis oblongis, planis, inferne alternis, superne constipatis," which was found "in Anglesea, in a small river that runs out of a pond, near Esquire Baly's." This plant is contained in the Dillenian Herbarium. The pondweed referred to at page 260 of Richardson's 'Correspondence,'—"In a lake at the foot of Gribgoch I found Potamogeton Lapathi minoris foliis pellucidis D. Lhwyd,"—as "possibly *P. heterophyllum*" is only young *P. polygonifolius* Pour.—G. C. Druce.

Peziza sumneria in Surrey.—This rare fungus has been found growing in some abundance in the grounds of Manresa House, Roehampton. It was first observed on March 19, under an elm, but in the immediate neighbourhood of a yew. This *Peziza* forms a large cup of nearly two inches in diameter, the rim of which is flush with the ground, the interior being smooth and of the colour of ordinary wax. When quite mature the cup opens out like a saucer, and there is a tendency to split at the rim. The size of the plant renders it very convenient for cutting into sections, so as to exhibit the sporidia in the asci which characterise the group to which the *Peziæ* belong. A quarter-inch objective shows them perfectly well, in various stages of growth.—J. T. O'Gorman.

Dialysis and Synanthy in Primula.—The following teratological facts are perhaps worth recording. A polyanthus has been received from Mrs. Pierce Butler, Hawkhurst, in which the flowers, all of the long-styled form, have the corollas divided nearly as far as the ring of stamens. The calyx is normal in all but one, which has six instead of five divisions. A primrose sent last year had three blossoms, exhibiting synanthy of two flowers, each in a different degree. The calyx is the same in all, the two calyces being combined into one tube with ten teeth. In blossom No. 1 there are two corollas, each with its own pistil and five stamens, all in the usual condition, except that the corollas cohere at the base. In No. 2, the corollas form one tube, with ten lobes and stamens, enclosing two pistils, which are quite separate. No. 3 resembles No. 2, except that the pistils cohere as far as the stigmas. The leaves also show cohesion. The midribs of two run close together half-way from the base, with scarcely any tissue between them; then they diverge, and form two apices of usual width, the edges cohering. In another case, two leaves start in the same way as the last, but soon the edge of the one on the right becomes free above, while the edge of the other adheres below. Another leaf adheres by its edge below the inferior one.—W. Fawcett.

Juncus Gerardi Lois. in Cambridgeshire.—In 1880 I gathered a *Juncus* in Somersham Park, Hunts, which I named *J. compressus* Jacq., and a little later in the same year, I found on the shore at

Hunstanton, a similar looking plant, but of more straggling growth, which careful examination induced me to refer to *J. Gerardi*. These two plants I submitted to Mr. H. C. Watson, who wrote as follows (Aug. 9, 1880) :—"I quite concur with your naming of the two *Junci*. Although they stand as two species in edit. 7 of London Cat. B. P, I have still my own inclination to hold them states or varieties of one single species. Stress has been laid on the tufted growth of the inland *compressus*, as against the creeping *Gerardi*, with its more or less solitary flower-stems. Now *J. compressus* occurs by the Thames on gravelly spots, and also in the crevices of stone walls which face the river and support the towing-path in the neighbourhood (Kingston, Molesey, Weybridge); and in these very local stations it is tufted; many of the tufts much too dense for pressure unless broken into less tufts. But alongside the towing-path between Molesey and Weybridge is a marshy meadow, in which the *Juncus* occurs, producing its flowering stems separated and usually singly: that is to say, the rhizome creeps easily through the marsh, ceasing to produce its numerous flower-stems in dense tufts, though assuming the habit of *Gerardi*. The stations here written of are all several miles higher up the river than the tide ever comes." With this note Mr. Watson sent me specimens of each of the forms, both of which agree with my Somersham Park plant in their roundish, blunt, abruptly-mucronate capsules; and the form from the "marshy meadow" further agrees in habit with a plant I gathered last season at Welche's Dam in Cambridgeshire, on a peaty swamp formed by the overflow or "wash" of the Old Bedford, down which the drainage of Somersham Park passes, and which probably brought the seeds from which the few plants sprang, from thence. Now in these Welche's Dam plants the flower-stems are often produced quite singly, and the habit of growth is just as creeping as that of any plant I have seen on the muddy shore at Hunstanton. Messrs. Arthur Bennett and W. H. Beeby, who have kindly examined these for me, concur in calling them *Juncus compressus*. All this goes to prove that we must not rely on habit of growth to enable us to separate the salt-marsh from the inland form; but as yet I have found the *shortly acuminate, strongly mucronate* capsule characteristic of *Gerardi* only in the sea-side form, as at Hunstanton, and with which a single specimen gathered at Foul Anchour, below Wisbech in Cambs. (July 28, 1881) exactly agrees. This form, which seems to grow only by salt water, is that which Mr. Watson concurred in calling *Juncus Gerardi*. —Alfred Fryer.

NEW PHANEROGAMS PUBLISHED IN PERIODICALS IN BRITAIN DURING 1883.

The periodicals cited in this list are: 'Botanical Magazine,' 'Gardeners' Chronicle,' 'Icones Plantarum,' 'Journal' and 'Transactions' of Linnean Society of London, 'Proceedings of Royal Society of Edinburgh.'

We have added in square brackets the publishers of certain

names which are cited from the MSS. descriptions or notes of those whose names have been assigned to them: e. g., *Clerodendron Lehuntei* was so named in MS. by Mr. Horne, but the publication of the name and description is due to Mr. Baker: we therefore print it *C. Lehuntei* Horne [Baker.] New genera are indicated by a prefixed asterisk.

Acalypha Baroni *Baker*. Madagascar. Journ. Linn. Soc. xx. 254. —A. Lyallii *Baker*. Id. 255.—A. Radula *Baker*. Id. 254.

*Acriulus griegifolius *Ridley* (Cyperaceæ Sclerieæ). Angola. Journ. Linn. Soc. xx. 336. — A. madagascariensis *Ridley*. Madagascar. Id.

Æchmea Barleei *Baker*. Honduras. Id. xx. 102.

Aeranthus Curnowianus *Rchb. f.* Madagascar. Id. xix. 305.

Aerides Lawrenciæ *Rchb. f.* Id. xx. 460. — A. lepidum *Rchb. f.* India. Id. xix. 466.

Ærua revoluta *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 92.

Æschynanthus apicidens *Hance*. China. Journ. Bot. 167.

Æschynomene Heurckeana *Baker*. Madagascar. Journ. Linn. Soc. xx. 130.—Æ. laxiflora *Baker*. Id.

Agauria polyphylla *Baker*. Madagascar. Id. 194.

Ajuga flaccida *Baker*. Madagascar. Id. 234.—A. robusta *Baker*. Id. 235.

Alchemilla bifurcata *Hils. & Boj.* ex *Baker*. Madagascar. Id. 137. —A. schizophylla *Baker*. Id.

Alectra pedicularioides *Baker*. Madagascar. Id. 214.

Allium Macleanii *Baker*. Cabul. Bot. Mag. t. 6707.

Aloe capitata *Baker*. Madagascar. Journ. Linn. Soc. xx. 272.—A. deltoideodonta *Baker*. Id. 271. — A. macroclada Baker. Id. 273. — A. oligophylla *Baker*. Id. 272. — A. squarrosa *Baker*. Socotra. Proc. R. S. Edinb. xii. 97.

Anagallis nummularifolia *Baker*. Madagascar. Journ. Linn. Soc. xx. 196.—A. peploides *Baker*. Id.

Andropogon trichozygus *Baker*. Madagascar. Id. 300.

*Angkalanthus oligophylla *Balf. f.* (Acanthaceæ). Socotra. Proc. R. S. Edinb. xii. 89.

Angræcum cryptodon *Rchb. f.* Madagascar. Gard. Chron. xix. 306.—A. modestum *Hook f.* Madagascar. Bot. Mag. t. 6693.

Anisotes diversifolius *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 88.

Anthospermum polyacanthum *Baker*. Madagascar. Journ. Linn. Soc. xx. 171.—A. thymoides *Baker*. Id.

Anthurium crassifolium *N. E. Br.* Columbia? Gard. Chron. xix. 10.

Apilia Baroni *Baker*. Madagascar. Journ. Linn. Soc. xx. 188.

Ardisia bipinnata *Baker*. Madagascar. Id. 201. — A. fuscopilosa *Baker*. Id. 200.—A. nitidula *Baker*. Id.

Argyrolobium emirnense *Baker*. Madagascar. Id. 125.

Aristea angustifolia *Baker*. Id. 269. — A. cladocarpa *Baker*. Id. 268.—A. Kitchingii *Baker*. Id. 269.

Aristolochia Soyauxii *Oliv*. Trop. Africa. Ic. Pl. 1410.

*Ballochia amoena *Balf. f.* (Acanthaceæ). Socotra. Proc. R. S. Ed. xii. 87.—B. atrovirgata *Balf. f.* Id.—B. rotundifolia *Balf. f.* Id.

Barleria aculeata *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 85. —B. argentea *Balf. f.* Id. 86.—B. tetracantha *Balf. f.* Id. 85.

BEGONIA CIRCUMLOBATA *Hance*. China. Journ. Bot. 203.—B. FIMBRISTIPULA *Hance*. China. Id. 202.—B. LEPROSA *Hance*. China. Id.

*BEMBICIA AXILLARIS *Oliv*. (Samydaceæ Homalieæ). Madagascar. Ic. Pl. 1404.

BLEPHARIS SPICULIFOLIA *Balf. f*. Socotra. Proc. R. S. Edinb. xii. 85.

BŒA DICTYONEURA *Hance*. China. Journ. Bot. 169.

BOLBOPHYLLUM PUNCTATUM *Fitzg*. China. Id. 205. — B. TIGRIDUM *Hance*. China. Id. 232.

BOMAREA LEHMANNI *Baker*. Andes. Id. 373.

BOUCEROSIA SOCOTRANA *Balf. f*. Socotra. Proc. R. S. Edinb. xii. 79.

BOUCHEA HANNINGTONII *Oliv*. E. Trop. Africa. Ic. Pl. 1446.

BREWERIA FASTIGIATA *Balf. f*. Socotra. Proc. R. S. Edinb. xii. 83. —B. GLOMERATA *Balf. f*. Id. B. PEDUNCULATA *Balf. f*. Id.

BROMUS ARRHENATHEROIDES *Baker*. Madagascar. Journ. Linn. Soc. XX. 301. — B. AVENOIDES *Baker*. Id. 302. — B. DISSITIFLORUS *Baker*. Id. 301.

BRYOPHYLLUM CRENATUM *Baker*. Madagascar. Id. 139.

BUDDLEIA AXILLARIS *Baker*. Madagascar. Id. 206. — B. FUSCA *Baker*. Id. 205.

BURMANNIA MADAGASCARIENSIS *Baker*. Madagascar. Id. 268.

CADIA ELLISIANA *Baker*. Madagascar. Id. 135. — C. PUBESCENS *Bojer* ex *Baker*. Id.

CALANTHE ANCHORIFERA *Rchb. f*. Polynesia. Gard. Chron. xx. 166. —C. CECILIÆ *Hort. Low*. [*Rchb. f*.]. Malaya. Id. xix. 432.—C. FORSTERMANNI *Rchb. f*. Birma. Id. 814.

CALYCOSA HUNTERI *Horne* [*Baker*]. Fiji. Journ. Linn. Soc. xx. 364.

CAMPTOLOMA VILLOSA *Balf. f*. Socotra. Proc. R. S. Edinb. xii. 84.

CAMPYLANTHUS SPINOSUS *Balf. f*. Socotra. Id.

*CARDIOCHLAMYS MADAGASCARIENSIS *Oliv*. (Convolvulaceæ). Madagascar. Ic. Pl. 1403.

CAREX BERMUDIANA *Hemsley*. Bermudas. Journ. Bot. 260 (t. 239). — C. EMIRNENSIS *Baker*. Madagascar. Id. 129 (t, 238). — C. SPHÆROGYNA *Baker*. Id.

CARISSA CRYPTOPHLEBIA *Baker*. Madagascar. Journ. Linn. Soc. XX. 204. — C. DENSIFLORA *Baker*. Id.

CASSINOPSIS CILIATA *Baker*. Madagascar. Id. 118.

CATTLEYA BRYMERIANA *Rchb. f*. 'n. sp. (?) seu. hybr. (?).' Gard. Chron. XX. 492.—C. SCHRODERIANA *Rchb. f*. Id. 102.

CELTIS HARPERI *Horne* [*Baker*]. Fiji. Journ. Linn. Soc. XX. 371.

CEPHALOCROTON SOCOTRANUS *Balf. f*. Socotra. Proc. R. S. Edinb. xii. 95.

*CEPHALOPHYTON PARKERI *Hook f*. (not described). Madagascar. Journ. Linn. Soc. XX. 250.

CHAILLETIA DISCOLOR *Baker*. Madagascar. Id. 119.

CHILOGLOTTIS TRILABRA *Fitzgerald*. Australia. Journ. Bot. 204.

CHIRITA CORTUSIFOLIA *Hance*. China. Id. 324.—C. EBURNEA *Hance*. Id. 168. — C. JULIÆ *Hance*. Id.

CHLOROPHYTUM DECIPIENS *Baker*. Madagascar. Journ. Linn. Soc. XX. 275.

CIRRHOPETALUM CLAVIGERUM *Fitzgerald*. Australia. Journ. Bot. 204.

CLEMATIS DISSECTA *Baker*. Madagascar. Journ. Linn. Soc. xx. 87.
CLERODENDRON GALEATUM *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 91.—C. GORDONI *Baker*. Fiji. Journ. Linn. Soc. xx. 370. —C. LAXIFLORUM *Baker*. Madagascar. Id. 229.—C. LEHUNTEI *Horne* [*Baker*]. Fiji. Id. 369. — C. LEUCOPHÆUM *Balf, f.* Socotra. Proc. R. S. Edinb. xii. 91. — C. MACROSIPHON *Hook. f.* Zanzibar. Bot. Mag. t. 6695.—C. ? PETUNIOIDES *Baker*. Madagascar. Journ. Linn. Soc. xx. 230.—C. PYRIFOLIUM *Baker*. Id. 228.—C. RAMOSISSIMUM *Baker*. Id.—C. RUBELLUM *Baker*. Id 229.—C. TENUIFOLIUM *Baker*. Id.
CLETHRA FABRI *Hance*. Journ. Bot. 130.
*COCHLANTHUS SOCOTRANUS *Balf. f.* (Asclepiadeæ Periploceæ). Socotra. Proc. R. S. Edinb. xii. 79.
*COCKBURNIA SOCOTRANA *Balf. f.* (Selagineæ). Id. 90.
*CŒLOCARPUM SOCOTRANUM *Balf. f.* (Verbenaceæ). Id. 91.
CŒLOGYNE CHLOROPTERA *Rchb. f.* Philippines. Gard. Chron. xix. 466. — C. SPARSA *Rchb. f.* Id. 305. — C. SALMONICOLOR *Rchb. f.* Sonda. Id. xx. 328.
CONVOLVULUS FILIPES *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 82. —C. OLIGODONTUS *Baker*. Madagascar. Journ. Linn. Soc. xx. 212. — C. SARMENTOSUS *Balf. f.* Socotra. Proc. R. Soc. Edinb. xii. 83.
CORDIA OBOVATA *Balf. f.* Socotra. Id. 80.—C. OBTUSA *Balf. f.* Id.
CORRIGIOLA PSAMMATROPHOIDES *Baker*. Madagascar. Journ. Linn. Soc. xx. 238.
CRASSULA NUMMULARIÆFOLIA *Baker*. Madagascar. Id. 138.
CRINUM FIRMIFOLIUM *Baker*. Madagascar. Id. 270.—C. LIGULATUM *Baker*. Id. 270.
CROTALARIA ORTHOCLADA *Baker*. Madagascar. Id. 124.— C. TENUIS *Baker*. Id.
CROTON ELÆAGNOIDES *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 95. — C. EMIRNENSIS *Baker*. Madagascar. Journ. Linn. Soc. xx. 252. — C. LUTEA-BRUNNEUS *Baker*. Id. 254. — C. NITIDULUS *Baker*. Id. 253. — C. SARCOCARPUS *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 94. — C. SOCOTRANUS *Balf. f.* Id. 95. — C. SULCIFRUCTUS *Balf. f.* Id. 94.
CRYPTOCARYA CRASSIFOLIA *Baker*. Madagascar. Journ. Linn. Soc. xx. 241.—C. DEALBATA *Baker*. Id.—C. MYRISTICOIDES *Baker*. Id.
CUSSONIA FRAXINIFOLIA *Baker*. Madagascar. Id. 157. — C. MONOPHYLLA *Baker*. Id. 155. — C. MYRIANTHA *Baker*. Id. 157. — C. RACEMOSA *Baker*. Id. 156. — C. VANTSILANA *Baker*. Id.
CYATHULA SPHÆROCEPHALA *Baker*. Madagascar. Id. 238.
CYCAS BEDDOMEI *Dyer*. Trans. Linn. Soc.
CYNOGLOSSUM CERNUUM *Baker*. Madagascar. Journ. Linn. Soc. xx. 211. — C. DISCOLOR *Baker*. Id. 212. — C. MONOPHLEBIUM *Baker*. Id. 211.
CYMBIDIUM GOMPHOCARPUS *Fitzgerald*. Australia. Journ. Bot. 203.
CYNOSORCHIS GIBBOSA *Ridley*. Madagascar. Journ. Linn. Soc. xx. 331. — C. GRANDIFLORA *Ridley*. Id. 332.
CYPERUS ATROBRUNNEUS *Baker*. Madagascar. Id. 281.—C. BAKERI *Clarke*. Mauritius. Id. 290.—C. BALFOURI *Clarke*. Bourbon.

Id. 289.—C. Baroni *Clarke*. Madagascar. Id.—C. galegensis *C. B. Clarke*. Galega. Id. 285. — C. heterocladus *Baker*. Madagascar. Id. 292. — C. immensus *Clarke*. Madagascar. Id. 294.

Cypripedium Curtisii *Rchb. f.* Sunda. Gard. Chron. xx. 8. — C. Robbelenii *Rchb. f.* Philippines. Id. 684.—C. tonsum *Rchb. f.* Sunda. Id. 262.

Cystorchis nebularum *Hance*. China. Journ. Bot. 232.

*Cystostemon socotranum *Balf. f.* (Borragineæ). Socotra. Proc. R. S. Edinb. xii. 82.

Dais gnidioides *Baker*. Madagascar. Journ. Linn. Soc. xx. 244.

Danais breviflora *Baker*. Madagascar. Id. 163. — D. Gerrardi *Baker*. Id. 160. — D. Hispida *Baker*. Id. 161. — D. ligustrifolia *Baker*. Id. 162. — D. microcarpa *Baker*. Id. 163. — D. pauciflora *Baker*. Id. — D. pubescens *Baker*. Id. 164. — D. rhamnifolia *Baker*. Id. — D. ternata *Baker*. Id. 162. — D. verticillata *Baker*. Id. 164. — D. volubilis *Baker*. Id. 161.

Dendrobium antelope *Rchb. f.* Moluccas. Gard. Chron. xix. 656. —D. Gordoni *Horne* [*S. Moore? Baker?*]. Fiji. Journ. Linn. Soc. xx. 322. — D. Harveyana *Rchb. f.* Birma. Gard. Chron. xix. 624. — D. Hornei *Horne* [*S. Moore? Baker?*]. Fiji. Journ. Linn. Soc. xxi. 373. — D. polycarpum *Rchb. f.* Sunda. Gard. Chron. xx. 492.

Desmodium monospermum *Baker*. Madagascar. Journ. Linn. Soc. xx. 131. — D. radiatum *Baker*. Id.

Dichætanthera arborea *Baker*. Madagascar. Id. 147. — D. cordifolia *Baker*. Id. 146. — D. oblongifolia *Baker*. Id. 147.

Dichopsis Hornei *Hartog* [*Baker*]. Fiji. Id. 367.

Didiptera effusa *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 89.—D. ovata *Balf. f.* Id.

Dicoryphe viticoides *Baker*. Madagascar. Journ. Linn. Soc. xx. 143.

Didissandra rufa *King*. [*Hook. f.*]. Tibet. Ic. Pl. 1437.

Didymocarpus demissa *Hance*. China. Journ. Bot. 166.

Dioscorea heteropoda *Baker*. Madagascar. Journ. Linn. Soc. xx. 271. — D. lanata *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 96. — D. tricantha *Baker*. Madagascar. Journ. Linn. Soc. xx. 271.

Dipcadi heterocuspe *Baker*. Madagascar. Id. 274.

*Disporopsis fusco-picta *Hance* (Liliaceæ). China. Journ. Bot. 278.

*Dittoceras Andersoni (Asclepiadeæ Marsdenieæ). Himalaya. Ic. Pl. 1422.

Dolicholobium Knollysii *Horne* [*Baker*]. Fiji. Journ. Linn. Soc. xx. 360. — D. Macgregori *Horne* [*Baker*]. Id.

Dombeya glechomæfolia *Baker*. Madagascar. Journ. Linn. Soc. xx. 101

Dorstenia gigas *Schweinf.* Socotra. Proc. R. S. Edinb. xii. 95.

Drimia Cowanii *Ridley*. Madagascar. Journ. Linn. Soc. xx. 334.

Duvalia angustiloba *N. E. Br.* S. Africa. Gard. Chron. xx. 230.

Echolium striatum *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 89.

Echinacanthus madagascariensis *Baker*. Madagascar. Journ. Linn. Soc. xx. 218.

ECTADIOPSIS BREVIFOLIA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 78. — E. VOLUBILIS *Balf. f.* Id.

*EGGERSIA BUXIFOLIA *Hook f.* (Nyctagineæ Pisoniæ). St. Thomas, W. Indies. Ic. Pl. 1401.

(To be continued.)

NOTICES OF BOOKS.

Flowers and Flower Lore. By the Rev. HILDERIC FRIEND, F.L.S. London: W. S. Sonnenschein & Co. 1884. 2 vols. 8vo., pp. xvi. 704. £1 1*s.*

THIS is a book which has long been looked forward to with interest by folklorists and other students of popular mythology, especially those who were acquainted with the author's 'Glossary of Devonshire Plant-names'—a work which showed his qualifications for dealing in fuller detail with the attractive subject of plant-lore. Their anticipations will be in great measure realised in these two handsome volumes. Mr. Friend has taken especial pains to collect his information from the lips of the people, and has in consequence at once attained to a level very much above that hitherto reached by works of the kind, which are usually mere compilations, often carelessly executed and abounding in inaccurate citations.

Our notice must perforce be a short one; and if we seem only to point out matters open to criticism, it must not be inferred that the value of the book is in any way impugned. But we cannot help feeling that Mr. Friend has been badly treated by his publishers, who, by the insertion of a large number of cuts—excellent in themselves, but quite out of place here—have spread into two what would have formed a single volume of convenient size, the result being to add to the cost without increasing the value of the work. The wish to produce a popular book must, we think, be responsible for the inconvenient plan of separating the "critical and bibliographical notes" from the chapters to which they belong.

There is an index to the illustrations, which is as unnecessary as the illustrations themselves, and a very good "index of names," after which come "additional corrections"—somewhat out of place, as they are not included in the index. The 'Brief Bibliography of Flower Lore,' which precedes the work, puzzles us a good deal. It includes all kinds of botanical works, a great many of which, such as Sachs' 'Text-book,' seem to have no connection with Mr. Friend's volumes; others have not yet appeared; while the principle of selection seems quite inexplicable. Why, for instance, should Paxton's 'Magazine of Botany' be included, while the 'Botanical Magazine' is omitted? If Loudon's 'Encyclopædia' finds a place, why not the 'Genera Plantarum? If Bentham's 'Handbook,' why not Babington's 'Manual'?

Like many other writers, Mr. Friend seems to accept as

genuine the purely arbitrary allotment of certain plants to certain saints which we find in Hone's 'Everyday Book,' Weale's 'Flores Ecclesiæ,' and later writers; and he also quotes in full the spurious antique by T. Forster which begins—

"The snowdrop in purest white arraie
First rears her head on Candlemas Daie."*

It is to be regretted that so able a writer should lend his authority to the propagation of these absurd dedications. Here and there we come upon a puzzling slip, as when we read (p. 143), "The Avens (*Geum urbanum*), also called Wild Rye and Way Bennett"; or that "the Marygold comes in at the Annunciation" (p. 103); or when we find quoted without correction a statement that "the White Lily expands about the time of the Annunciation." Another irritating custom—which Mr. Friend, knowing how desirable it is to be able to verify quotations, ought not to support by his practice—is that of citing passages from "a writer," "a learned writer," "an old writer," and the like; or placing them between inverted commas with no indication of the source whence they are derived. It is a pity to introduce the *odium theologicum* into the work, as is done on page 254, where Mr. Friend first tells us that the name of Passion Sunday "is indelibly impressed upon the Passion-flower," which is not the case; then quotes one of Forster's doggrel couplets—

"The Passion-flower long has blow'd
To betoken us signs of the Holy Rood."

and adds, "the poetry is little more to be commended than the old Romish idolatry to which it points." Nor is it quite seemly to refer to the Blessed Virgin as "her ladyship" (pp. 6, 84, 85, 86, 87, 94).† As an antiquarian he should know that the blessing of palms and other branches upon Palm Sunday is not a thing of the past, as he seems to imply when he says that they "*used to undergo* a regular blessing"; and he need not go to "Roman Catholic countries" to see "sprigs of boxwood (*sic*) used as a substitute for palms." Turner's characteristic remarks on this subject can hardly have escaped Mr. Friend's notice. He quotes quite seriously "a proverb still current in the north of England, to the effect that 'He that hath not a palm in his hand on Palm Sunday must have his hand cut off,'" though it is evident that a mere play upon the two meanings of the word palm is intended. It is not "the Anemone" but the Hepatica which is called Herb Trinity, and this not "on account of its having three leaflets combined in one leaf," but because the simple leaf is three-lobed. "Midsummer Silver," mentioned by Aubrey, is undoubtedly *Potentilla Anserina*. The

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* It is perhaps worth while to point out that this constantly quoted poem first appeared in T. Forster's 'Perennial Calendar' (1824), p. 107, followed by a reference to "Anthol. Austr. et Bor." (Anthologia Australis et Borealis)—a work which never existed.

† There seems some awkwardness of expression in the passage (p. 100)—"Freyja and Mary are in many respects to be regarded as but different names for *one and the same mythological personage*"!

"Lunarie" of Chaucer and Drayton is not *Lunaria*, but *Botrychium*. Mr. Friend quotes the curious account of the plant springing from graves at Woking, given by Aubrey in his Nat. Hist. of Surrey, iii., 225–6, and says, "it may be suggested that the plant spoken of by Aubrey would seem to be a kind of Horsetail (*Equisetum*)"; but this suggestion, of the corrrectness of which there can be little doubt, was originally made by the writer of this notice.*

We are sure that Mr. Friend could have made his book of more permanent value to the student, but it may be that in so doing he would not have received so much support from the general public as he is now likely to do. The volumes are eminently readable, and contain much valuable original information. J. B.

The fourth edition of the well-known Text-book, Henfrey's 'Elementary Course of Botany,' will be published early in May. The morphology of flowering plants has been revised and added to by Dr. Maxwell Masters, who has also made great additions to the physiological portions; while Mr. A. W. Bennett has rewritten the sections relating to Cryptogamia. This new edition will be still further enriched by numerous additional illustrations.

Articles in Journals.

American Naturalist.—J. M. Anders, 'Exhalation of Ozone by Flowering Plants.'—C. E. Bessey, 'Glands on *Sporobolus heterolepis*.'

Botanical Gazette.—A. Gray, 'Antirrhina Prehensilia' (*A. Orcuttianum*, *A. Nivenianum*, *A. subsessile*, spp. nn.)—G. Vesey, 'Schedule of North American species of *Paspalum*.'—J. M. Milligan, 'Elihu Hall' (1822–1882).

Bot. Centralblatt (No. 16).—F. Schindler, 'Zur Kenntniss der Wurzelknöllchen die Papilionaceen.'— (No. 17). F. von Mueller, 'Einige Bemerkungen zu den Regeln der Pflanzen-Bneennungen.' —F. Ludwig, 'Ueber den Fliegenbesuch von *Molinia cærulea*.'

Botanische Zeitung (Mar. 28.) — M. Scheit, 'Die Wasserbemeurung in Holze.'—H. Hoffmann, 'Culturversuche über Variation.' — (Ap. 4, 11, 18).

Botaniska Notiser (Haft 2).—B. Jonsson, 'Protoplasmarörelse inom rothåren hos fanerogama vaxter.'

Bull. Bot. Soc. France (xxxii. Comptes Rendus, 1).—C. E. Bertrand, 'Loi des Surfaces Libres.' — ' E. Coscardas, 'Idées nouvelles sur la Fermentation.'—' G. Bonnier & L. Mangin, 'Sur l'absence d'absorption ou de dégagements d'azote dans le respiration des Champignons.'—J. Constantin, 'Influence du Milieu sur la structure anatomique de la racine.'—P. Van Tieglem, 'Les Canaux sécréteurs du péricycle dans la tige et la feuille des Ombelliféres des Araliées et des Pittosporées.'—J. Godfrin, 'Sur l'anatomie

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* See Aubrey's 'Remains of Gentilisme and Judaisme' (edited for the Folk-lore Society by James Britten), p. 253.

comparée des Cotylédons et de l'Albumen.'—E. Mer, 'Le Mécanisme et la cause de la pénétration dans le sol et de l'enracinement de l'extremité des tiges de Ronce.'

Bulletin of Torrey Bot. Club (March).—E. Tuckerman, 'Two Lichens of the Pacific Coast' (*Staurothele Brandegei*, n. sp.)—C. H. Peck, 'New Fungi' (*Myriadoporus*, gen. nov.). — N. L. Britton, '*Cyperus Rusbyi*, n. sp.'—A. F. Foerste, 'Development of *Dodecathea*.'

Garden (Ap. 26).—A. D. Webster, 'Ferns of Carnarvonshire.'

Gardeners' Chronicle (Ap. 5). — F. W. Burbidge, 'The Narcissus' (figs. 78–80, 87). *Odontoglosson ioplocon* Rchb. f., n. sp. — C. B. Plowright, 'Mr. Jensen on the Potato-disease.'—(Ap. 12.) *Calanthe proboscidea* Rchb. f., n. sp. — J. G. Baker, 'Hybrid Cape Gladioli.'—M. T. Masters, '*Pinus* (*Laricio*) *Karamana*' (fig. 91). (Ap. 19). C. B. Plowright, 'Canker in apple trees' (figs. 99–101). *Dendrobium profusum* Rchb. f., *Aerides Roebelenii* Rchb. f., *Carmichaelia uniflora* T. Kirk, *C. Enysii* T. Kirk, spp. nn.—(Ap. 26.) W. G. Smith, 'Artotrogus.'

Journal of Royal Microscopical Society. — J. P. Bisset, 'Desmidiæ found in gathierings near Lake Windermere, 1883' (*Cosmarium Layiense*, Biss.; *Staurastrum levispinum* Biss.; *Penium lagenaroides* Roy; *P. cucurbitinum* Biss., spp. nn.) — G. Massee, 'Formation and growth of cells in *Polysiphonia*' (plate).

Knowledge (Ap. 4, 25).—Grant Allen, 'Evolution of Flowers.'

Midland Naturalist. — W. Hillhouse, 'Intercellular relations of Protoplasts.'—J. E. Bagnall, 'Flora of Warwickshire' (*Plantagineæ—Polygonaceæ*).

Nuovo Giorn. Bot. Italiano. — A. Goiran, 'Prodromus floræ Veronensis' (contd.)—C. Lacaita, '*Statice remotispicula*, sp. n.'—W. O. Focke, '*Rubus Calderianus*, *R. brachybotrys*, spp. nn.'—R. F. Solla, 'Contribuzione allo studio degli stomi delle Pandanee' (2 plates).

Oesterr. Bot. Zeitschrift. — L. Celakovsky, 'Ueber *Cleome ornithopodioides* L. und verwandte Arten (*C. aurea*, *C. cypria*, spp. nn.)—F. v. Holmel, 'Ueber die Pinkos-Knollen.'

Pharmaceutical Journal (Ap. 26). —H. G. Greenish, '*Nigella sativa*.'

Scottish Naturalist. — W. L. Davidson, 'Scientific Method in Biological Classification' (contd.) — W. Durie, 'Plant-names.' — F. B. White, '*Trifolium agrarium* as a probable British plant.'—G. C. Druce, 'Botanical work of George Don.'—J. Stevenson, 'Mycologia Scotica.'

Our accounts of the Linnean Society's proceedings, short notices of books, &c., are held over for want of space.

ON *EUPHRASIA OFFICINALIS* L.

By Frederick Townsend, M.A., F.L.S.

The question whether *Euphrasia officinalis* L. represents a single polymorphic species, or a collective species, and what rank its numerous forms should take as representatives of the genus, are questions upon which botanists have been much divided. For some time past this enquiry has occupied my attention, and I am glad of an opportunity to make known to others similarly interested in the subject the conclusions I have been led to. I at present confine myself to the European forms, though I am aware that the subject cannot be treated satisfactorily without taking into consideration all the known forms. But, with the exception of the species with mucronate and not spurred anthers (mostly Australian species, which, as Dr. Adolph Engler* remarks, remind one more of *Bartsia*, and are not through any other species connected or linked with those of the northern hemisphere), the extra-European forms are not numerous; and though I do not further allude to them, yet I have not left them out of consideration, but have been influenced by them in forming my conclusions.

Many of the European forms are attractive from their beauty, and not unfrequently they force themselves into notice by their abundance, forming, as they do in such cases, a feature in the near landscape, especially in pasture land, both in the lowlands and in the alps. The power possessed by the whole group to vary within narrow and defined limits, taken together with the relative constancy or stability of some forms, within certain areas, make these plants of especial interest in a biological point of view; and I cannot think time is ill-spent which is devoted to the study of such polymorphic groups in which inherent power of variableness seems to be a law, though some botanists think otherwise, and would confine their study to what they term true species. The inherent power of stability, *i. e.*, of retaining character under varied conditions, is very wonderful, and in these days is perhaps hardly sufficiently recognised; but none the less remarkable is the inherent power to vary given to certain groups of plants, well-known instances of which are also seen in *Rubus*, *Rosa*, *Hieracium*, &c.; and I would here endorse the remarks of a correspondent and able botanist,† who writes—"I would not join with those who depreciate the value of the careful study of the numerous forms presented by polymorphic plants such as our Old World *Euphrasia*, provided the work be carefully executed, and without the object of merely adding to the pile of nomenclature. So far from undervaluing them, I look forward to our gaining much additional light on the relations of the organised world from such enquiries when directed by close, careful, and prolonged observation"; he adds that a study of the

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* 'Entwicklungsgeschichte der Pflanzenwelt,' ii., 101.

† Mr. John Ball, F.R.S., F.L.S., &c.

forms should be connected with that of the insect-visitors, an advice which all should bear in mind who have the opportunity of carrying out such a study. Cross-fertilization appears to come into play and to be secured in most if not all the forms of *Euphrasia*, by the position of the stigma, which in an early stage is situated above and in front of the anthers, so that it comes first in contact with the pollen brought from other flowers by the visiting insect; and should fertilization by this method fail to be effected, self-fertilization is secured by two different methods, *viz.*, in the larger-flowered forms by the lengthening of the corolla-tube, in the smaller-flowered forms by the curving downwards of the upper portion of the style, both methods bringing the stigma ultimately in closer contact with the anthers.*

I have said that botanists have hitherto been much divided as to whether all the forms should be considered as members of a single polymorphic species, or whether few or many should take the rank of species. Fries, in his Summa Veg. Scan.. p. 195, remarks—"Euphrasiæ officinalis innumeras formas in definitas reducere species difficillimum est; sincere, et frustra studui nostras tam inter duas Kocheanas, quam quattuor Reichenbachianas dispescere." And he adds—"Duas tamen latere species, cum Rh. majori et minori analogas, nobis persuasum est, easque *pro tempore* sic definio." The two which he gives are *E. officinalis* L. Spec. p. 841, and *E. gracilis* Fr. Litt. Tidn. And he describes under the former a subspecies which he names *E. parviflora*. Koch, in his 3rd ed. of the 'Synopsis,' describes four species. More recently Jordan, Grenier, Boreau, Timbal-Lagrave, Dalla Torre, Kerner, &c., admit and describe numerous distinct species, bringing the number of these in Europe to upwards of twenty.†

Soyer-Willemet, in his Mem. Soc. Nancy (1828), pp. 104–107, and 1833, pp. 23–33, has given us the results of his studies in this direction, and we will follow shortly the road by which he arrived at the construction of the three species and nine subspecies which he describes. In his earlier notice he places the comparative size of the flower in the first rank as affording characters for specific

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* Müller thinks that *E. montana* Jord. is, in the absence of insects, incapable of self-fertilization ('The Fertilization of Flowers,' Herm. Müller, transl. by W. D'Arcy Thompson, p. 449, Lond. 1883). In connection with this subject Mr. J. G. Baker suggests to me the enquiry whether the four stamens and pistil are always perfect and complete in every flower, and how far, in other ways than those I have already alluded to, the flowers of *Euphrasia* are identical as regards the character and function of the reproductive organs; and whether, as is the case in *Thymus* and *Calamintha*, differences in these organs may not be correlated with differences in the shape, size, and cutting of the calyx and corolla. Also how far the parasitic nature of *Euphrasia* has to do with such differences as I have attempted to register and analyse.

† Grenier, in 'Flore Jurassique,' describes seventeen species. Boreau, in 'Fl. du Centre,' describes nine species. Timbal-Lagrave, in 'Bull. Soc. Bot. de Fr.' (1871), describes seventeen species. Dalla Torre, in his 'Anleitung zu wissenschaftlichen Beobachtungen auf Alpenreisen,' Wien (1882), describes eleven species. A. Kerner, in his 'Schedæ ad Fl. exsicc. Aust. Hung.' (1881), has described, as new, four species; and Dr. G. Beck has described one in 'Verhand. der Kaiserl.-kœnig. Zool.-bot. Gesell. in Wien' (1883), p. 225.

distinction; in his second paper he modifies his former opinion, and considers that he attached too great weight to the comparative size of the corolla, which he now believes to be variable; he therefore includes the form of the leaves, remarking that this character sufficed for Koch to retain as species *E. minima*, *E. salisburgensis*, and *E. tricuspidata*. He now alludes to the greater importance of the presence or absence of glandular hairs, and upon this, together with the form of the leaves, he founds three species, subdividing each into three subspecies by the comparative size of the corolla. I believe Mr. Soyer-Willemet is right in attaching great importance to the form of the leaf, but he attaches too little to the corolla, if taken in connection with the stamens and style, and too much to the absence or presence of glandular hairs. His species are artificial ones, and so are his subdivisions or subspecies. As regards the parts from which the characters should be drawn, and the weight which should be given to these, I would place them somewhat as follows:—(*a*) The direction of the style during flowering (first noticed, I believe, by Kerner); (*b*) the form of the leaves and bracts, also the form, direction, and number of the teeth of both these; (*c*) the nature of the hairs on the leaves and calyx; (*d*) the form and colour of the corolla; (*e*) the mode of branching; (*f*) the form of the calyx and capsule, &c.

My own conclusion is that all the European forms with which I am as yet acquainted (omitting *E. grandiflora* Hochst. as extra-European) are members of a single polymorphic species, and that none of these members can be ranked as of a higher grade than a subspecies. But I believe that these naturally arrange themselves into eight groups; and the main object of the present paper is to give the diagnosis of these, each of which I have designated by the name of a well-known species contained within the group. The adoption of this nomenclature is convenient because the names at once call to mind the salient features of the groups, which are—I. Officinales; II. Montanæ; III. Tricuspidatæ; IV. Nemorosæ; V. Graciles; VI. Salisburgenses; VII. Parvifloræ; VIII. Minimæ.*

After giving the characters of a group, I have notified the apparent rank of its members by the signs employed by Nyman in his 'Sylloge Floræ Europææ.' At a future time I hope to give diagnostic characters of the subspecies and varieties, but for the present I give those of the groups only. I hope that the publication

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* Only three of these groups are represented in Great Britain and Ireland. Group I. is represented by *E. Rostkoviana*, the forms of which approach the var. *montana* (*E. montana* Jord). This seems to be generally distributed, but is perhaps more abundant in Scotland. Group IV. is represented by *E. nemorosa* H. Mart. This seems to be the common form throughout England. I have it from the Firth of Forth. I did not notice it in Invernesshire. Some forms of this may certainly be placed with the var. *rigidula* (*E. rigidula* Jord.). Group V. is represented by *E. gracilis* Fries. This seems to be abundantly and widely distributed in Scotland. I have seen specimens from Ireland. I have it from Cumberland, Shropshire, Warwickshire, Sussex, and Surrey. It is reported from Cornwall, &c.

of this paper may induce botanists to criticise my work, so that, should there be any value in it, it may ultimately be made more perfect in its character than it could now be without such help. The geographical range of the several forms is a most important and interesting consideration, but I defer this also to a future occasion. I confine myself now to a notice of the geographical range of each group, or rather of the representative form in each group. The matter contained under the head "Connecting Links" suggests that, as I believe will be found to be the case, forms are to be met with which it will be difficult to place. As regards the prevalent colour of the flowers in each group, I have as yet worked this out but imperfectly, and this study should especially be carried out in connection with insect-life.

I conclude my paper by inviting botanists kindly to communicate to me dried or fresh specimens of interesting or new forms, and any remarks which may enlarge our knowledge of the genus, and by thanking my numerous continental and other correspondents for their kind assistance, and more particularly for the loan of specimens from their own herbaria; I would especially desire to thank Mr. E. Fiek, of Hirschberg; Prof. Favrat, of Lausanne; Mons. Malinvaud, of Paris; Mr. J. Lloyd; Mr. E. Burnat; Mr. le Dr. B. Martin, of Aumessas; Mr. A. Kerner, of Vienna; Mr. W. Barbey, who has entrusted to me for examination the Euphrasias from the herbarium of the late G. F. Reuter, now in his possession; Mr. J. Ball, F.R.S.; Mr. G. C. Churchill; Mr. G. Nicholson, of Kew; Dr. Keck, of Aisterscheim; Mr. Timbal-Lagrave, &c.

EXPLANATION OF SIGNS, &c.

a = Generally distributed.	* = Subspecies.
b = Widely distributed, but confined to certain areas.	—— = Variety.
c = Local.	— = Subvariety.
d = Very local.	+ = Doubtful.
	× = Hybrid.

ARRANGEMENT OF EUPHRASIA OFFICINALIS L.

GROUP I.—OFFICINALES (*a*).

Flowers large, tube of corolla lengthening during flowering. Style ultimately nearly straight. Stem usually branched. Upper portion of stem, bracts, and calyx usually with glandular hairs. Leaves and bracts ovate, cordate-ovate, or subreniform. Teeth numerous, 5–6,* directed forwards, or the lower ones spreading. Calyx-teeth triangular-lanceolate, acute. Capsule obovate or oval, truncate-emarginate, usually exceeding its bract.

Agrarian, sometimes subalpine.

Flowers tending to white.

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* Throughout this paper the number of teeth refers to those on either side of the leaves and bracts.

FORMS CONTAINED IN GROUP I.

* *E. Rostkoviana* Hayne = *E. officinalis* α. *pratensis* Fr.
— var. *alpestris* Gremli (an eglandular form).
—— *E. campestris* Jord. = *E. uliginosa* Jord.
—— *E. montana* Jord. = *E. picta* Wimm. (*E. alpestris* Wimm., olim p. part.)
\+ *E. versicolor** Kern.

CONNECTING LINKS.—Connected with ALPINÆ through *E. versicolor* and *E. montana*. There are also eglandular and paucidentate forms, which appear to connect OFFINALES with ALPINÆ.

GROUP II.—ALPINÆ (*c*).

Flowers large, tube of corolla lengthening during flowering. Style ultimately nearly straight. Stem simple or branched from below. Leaves, bracts, and calyx glabrous or hispid; bracts with more or less cuneate entire base; teeth 3–5 on either side, directed forwards or spreading, lanceolate, acuminate-subulate or cuspidate. Capsule oblong truncate-subemarginate.

Subalpine, alpine, pascual.

Colour of flowers tending to blue.

FORMS CONTAINED IN GROUP II.

* *E. alpina* Lam. = *humidula* Jord.
— var. *vestita* Gremli.
* *E. cærulea* Tausch.
* *E. arguta* Kern.

CONNECTING LINKS.—Connected with OFFICINALES through *E. versicolor* and *E. montana*.

GROUP III.—TRICUSPIDATÆ (*d*).

Flowers large, tube of corolla lengthening during flowering. Style ultimately nearly straight. Plant simple or branched from about the middle of the stem. Leaves glabrous, linear or lanceolate, with 2–4 lateral, distant, spreading teeth on either side, or teeth obsolete. Capsule oblong, truncate-emarginate, shorter than its bract.

Subalpine and alpine, rupestral.

Flowers inclining to white or lilac.

FORMS CONTAINED IN GROUP III.

* *E. tricuspidata* L.
* *E. ramosissima* Reut. (1856) = *E. Carniolica* Kern. (1882).

CONNECTING LINKS.—Connected with SALISBURGENSES, as regards foliage, through *E. salisburgensis* vars.

GROUP IV.—NEMOROSÆ (*a*).

Flowers moderate in size or small, tube of corolla not lengthening during flowering. Style ultimately hooked above. Stem simple or profusely branched. Plant very rarely glandular (and when glandular, glands sessile), usually glabrous or sparsely hispid, or scabrid. Leaves and bracts ovate or oblong, usually with numerous (4–6) approximate teeth on either side directed forwards

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* Some of my specimens of *E. versicolor* Kern. have glandular hairs, which does not agree with Kerner's diagnosis in his 'Schedæ.'

or the lower ones spreading, triangular or triangular-lanceolate, cuspidate or subulate (lower leaves often obtuse). Capsule obtuse, entire or truncate-emarginate, oblong or linear, longer or shorter than its bract.

Agrarian, rarely subalpine; pascual, and ericetal.

Flowers inclining to white or purple.

FORMS CONTAINED IN GROUP IV.

* *E. nemorosa* H. Mart. = *E. officinalis* Bull.
— *E. stricta* Host.
— *E. rigidula* Jord.
— *E. tetraquetra* Breb.
— *E. nitidula* Reut.
—— *E. ericetorum* Jord.
* *E. majalis* Jord.
—— *E. Cebennensis* Mart.
* *E. pumila* Kern.

CONNECTING LINKS.—Connected with PARVIFLORÆ through *E. majalis* and *Cebennensis*; with GRACILES through forms of *E. nemoralis;* with MINIMÆ through *E. pumila* Kern.; with SALISBURGENSES through *E. Corsica*.

GROUP V.—GRACILES (*b*).

Flowers small, tube of corolla not lengthening during flowering. Style ultimately hooked above. Whole plant slender, usually with few branches from about the middle of the stem. Leaves and bracts ovate or oblong, usually with cuneate base, and therefore rhomboidal; teeth few, 3–4, triangular, of lower leaves blunt, of bracts acute or cuspidate. Capsule oblong truncate, sometimes retuse, exceeding its bract. (Primary raceme usually occupying only the upper half of the stem).

Agrarian, sylvestral, and ericetal.

FORMS CONTAINED IN GROUP V.

* *E. gracilis* Fries.
— *E. micrantha* Reich.

CONNECTING LINKS.—Connected with NEMOROSÆ through *E. rigidula* and forms of *E. nemoralis*.

GROUP VI.—SALISBURGENSES (*b*).

Flowers small, tube of corolla not lengthening during flowering. Style ultimately hooked above? Stem simple or much branched throughout. Leaves and bracts (rarely ovate) oblong, lanceolate or linear, with cuneate base, with about 3 distant and equidistant (4 in *E. Soyeri* and *E. Soubeiraniana*, 3–4 in *E. nivalis*, 5 in *E. Corsica*) teeth, those of lower leaves blunt, those of bracts lanceolate-subulate, spreading, porrect (teeth sometimes reduced to two on either side). Capsule narrow, oblong or linear, or truncate, sometimes slightly emarginate, shorter than its bract.

Subalpine and alpine, sylvestral and rupestral.

FORMS CONTAINED IN GROUP VI.

* *E. salisburgensis* Hoppe.
— var. *laxa* Reut.
— var. *angustifolia* mihi.
— *E. cuprea* Jord.
* *E. Soyeri* Tim.-Lag. = *E. Lapeyrousii* Soy.-Will.
* *E. Soubeiraniana* Tim.-Lag.
* *E. nivalis* Beck.
* *E. Corsica* mihi, non Lois.

CONNECTING LINKS.—In the foliage *E. salisburgensis* var. *angustifolia* mihi connects SALISBURGENSES with TRICUSPIDATÆ.

Group VII.—Parvifloræ (*b*).

Flowers small, (crowded above?, raceme usually elongate), tube of corolla not lengthening during flowering. Style ultimately hooked above? Plant simple or branched, glandular or hispid. Leaves and bracts broad, with prominent veins beneath; teeth triangular or lanceolate, cuspidate or subulate. Capsule oval or oblong, truncate or truncate-emarginate. Capsule usually shorter than its bract, sometimes equalling or even exceeding it.

Subalpine and Scandinavian.

Forms contained in Group VII.

* *E. parviflora* Fries.
—— *E. puberula* Jord.
—— *E. brevipila* Burnat & Gremli MS.
* *E. hirtella* Jord.
— *E. polyadena* Gren. & Roux.

Connecting Links.—Connected with Nemorosæ throngh *E. puberula*, *E. ericetorum*, and *E. majalis*.

Group VIII.—Minimæ (*b*).

Flowers small (larger in *E. pulchella*), tube of corolla not lengthening during flowering. Style ultimately hooked above. Plants of low growth, usually eglandular. Stem usually simple, sometimes branched. Leaves and lower bracts broad, orbicular, oval, or elliptic-oblong (stalked?), with few (2–4 on either side, very rarely 5), obtuse teeth, middle lobe very obtuse; broader than long. Capsule short, broad, obovate or shortly obovate, oblong, truncate-emarginate, usually shorter than or about equalling its bract.

Alpine, pascual.

Colour of flowers tending to yellow.

Forms contained in Group VIII.

* *E. minima* Jacq.
—— var. *glandulosa* mihi.
——
or × } *E. intermedia* mihi.
—— *E. exigua* Reut.
— *E. minor* Jord.
* *E. pulchella* Kern.
× *E. Lepontica* Brügg. (*alpina* × *minima* and *stricta* × *minima*).

Connecting Links.—Connected, through forms of *E. minima*, with Parvifloræ; through *E. parvula* with Nemorosæ.

Analytical Key to the Groups.

1. Tube of corolla lengthening during flowering; style ultimately nearly straight 3
2. Tube of corolla not lengthening during flowering; upper portion of style ultimately hooked above 7
3. Plant glandular above; bracts broadly ovate, orbicular, subcordate, or reniform; upper teeth directed forwards . . . *Officinales.*
4. Plant glabrous; bracts ovate or ovate-oblong, with more or less cuneate entire base and upper teeth usually spreading, or bracts lanceolate or linear 5
5. Bracts ovate, ovate-oblong, or obovate, with more or less cuneate base; teeth 3—5 on either side . . . . . *Alpinæ.*
6. Bracts linear, with 1—2 teeth on either side, or teeth obsolete. *Tricuspidatæ.*

7. Teeth of leaves and bracts 2—4 on either side	9
8.*Teeth of leaves and bracts 4—6 on either side	13
9. Teeth of leaves triangular or lanceolate, those of the intermediate leaves acute	11
10. Teeth of leaves rhomboidal, obtuse	*Minimæ.*
11. Teeth of bracts lanceolate-cuspidate or subulate, distant; capsule shorter than its bract	*Salisburgenses.*
12. Teeth of bracts triangular, approximate; capsule exceeding its bract.	*Graciles.*
13. Leaves broad, veins prominent beneath; whole plant glandular or hispid	*Parvifloræ.*
14. Plant glabrous or sparsely hairy, rarely with sessile glands.	*Nemorosæ.*

ON SOME DEVONIAN STATIONS OF PLANTS NOTED IN THE LAST CENTURY.

By T. R. Archer Briggs, F.L.S.

My attention has been recently directed to Sir Francis Henry Drake, Bart. (born Aug. 26th, 1722; died Feb. 19th, 1794), of Buckland Abbey and Nutwell Court, Devon, as an early investigator of the Botany of his country, through my having purchased a copy of Hudson's 'Flora Anglica,' ed. 1, 1762, that doubtless belonged to him, containing a number of MS. notes, stated in a book-catalogue in which it was advertised to have been made by "Sir Henry Drake." They are records of stations of plants lying mainly in the neighbourhood of either Buckland Abbey, near Plymouth, or of Nutwell Court, in the parish of Woodbury, both still seats of the Drake family. Fortunately a date "13 Sep. 1784," attached to one of the entries, marks the time about which they were inserted. Of this Sir Francis Henry Drake we find Polwhele, in his 'History of Devonshire,' writing as follows:—"The late Sir Francis Drake, of Nutwell, is said to have been a proficient in Botany. . . . . During his occasional residences in Devonshire he was pleased to confine himself within the circle of his own grounds; averse from social communication, and particularly inaccessible to men of talents and literature." These words of Polwhele give the impression of his having suffered some real or imaginary slight at the botanist-baronet's hands, and we find reason to doubt the correctness of his ill-natured remarks from statements in Jones & Kingston's 'Flora Devoniensis' which prove intercourse and association between Drake and Hudson. Here are plant-stations inserted on their joint authority, and also the record under one species—"Sir Francis Drake and Mr. Hudson found this, &c."

Considering the Drake family produced the famous Sir Francis of the Elizabethan age, and likewise, on the mother's side, Lord Heathfield of the Georgian era, the celebrated defender of Gibraltar, it is interesting to connect the name of one of the race with that of

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* Dwarf and stunted specimens coming into this division have sometimes leaves with only 2-4 teeth on either side.

the introducer of the Linnean system of classification of plants into England and the author of a Flora that was for some time the valued text-book of its botanists.

Remembering the period at which the MS. notes of Sir Francis Henry Drake were made, I think most are of sufficient interest to be reproduced here, so I subjoin them, with occasional remarks of my own in [], either in addition or explanation. I give the species under the names he uses, with those of the 'London Catalogue,' ed. 7, added, when the two differ:—

Aquilegia vulgaris L. On the left side of the park close at the entrance of the wood as you go from Blindwell Orchard towards the Red. Gate. [This station belongs to Dist. III. of 'Flora of Plymouth,' and the Columbine still occurs in the neighbourhood of Buckland Abbey].

Fumaria claviculata. *Corydalis claviculata* DC. On the hedge on the left of the lane twixt Peter-Tavy and Mary-Tavy. [Still grows in many places about Dartmoor]. — *F. capreolata*. On the left hand hedge just before you come to the turnpike at Suchalitch Lane from Nutwell. [Most probably *F. confusa* Jord. of the segregates; the generally diffused and only common one of Devon and Cornwall].

Thlaspi campestre. *Lepidium Smithii* Hook. On the hedge on the left in the lane twixt Peter-Tavy and Mary-Tavy. [The habitat makes it nearly certain that the plant was *L. Smithii*, and not *L. campestre*, two confused together in the time of Drake and Hudson; moreover, *L. Smithii* is by far the commoner plant in Devon and Cornwall].

Iberis nudicaulis. *Teesdalia nudicaulis* Br. On the left hand hedge just before you enter the gate that leads from Wigvor Down to Greenvil Farm-house. [The plant still grows here, and the statement "Banks about Wigvor Down" in 'Flora of Plymouth' may be held to cover this earlier-noticed station. I may here remark that Jones & Kingston have the following in their 'Flora Devoniensis':—"*Arabis hispida*. Wigvor Down, near Meavy, betwixt the gully and the gate leading to Greenvil Farm, Sir Francis Drake & Mr. Hudson, 110." As nothing of Hudson's in either of the editions of his 'Flora Anglica,' nor of Drake's in these MS. notes, supports Jones & Kingston's statement, the probability is that, through some confusion of *Teesdalia* with *Arabis petræa* Lam., they originated an erroneous Devonian record for the latter].

Viola palustris. On all the bogs on Woodbury and Limpston Hills.

Drosera rotundifolia. On all the bogs on Woodbury and Limpston Hills; on Bovey Heathfield; in the bottom twixt Dalymore and Cholwich Town. — *D. longifolia*. *D. intermedia* Hayne. The same stations. [Both this and the last still grow on Bovey Heathfield. The last station comes under Dist. V. of 'Flora of Plymouth,' and the two plants are both recorded therein as species of the locality, though at the time when they were so entered I was unaware they had been seen and noted as plants of the place nearly 100 years before].

Corrigiola littoralis. On Slapton Sands, 13 Sept. 1784, W. H.; close on the waterside of the Lee, in the sand all along on the west of the bridge. [The names of this plant are transposed in the note, one made in pencil, replacing an older erased one in ink, with reference to what I suppose to have been a station for *Polycarpon tetraphyllum.* Withering and Smith both state this plant to have been found by Hudson at Slapton, where the collection of water is at present called the Lea, and the neighbouring sands continue to be a station for the *Corrigiola.* This note is altogether of great interest, especially as the W. H. doubtless stands as the initials of William Hudson, with whom Drake might have been in company when he discovered the plant. By variation in the respective statements of this station in 'Botanist's Guide' and 'Flora Devoniensis' it has been copied from both into Watson's 'New Botanist's Guide,' to appear as two stations].

Hypericum Elodes. On the bog nearest Budley Saltern, at the lower part of it; on the bogs on Bovey Heathfield; in the bottom twixt Dalymore and Cholwich Town; on the bogs on Tolchmore. [The two last stations lie between Shaugh and Cornwood, both named for this in 'Flora of Plymouth.' It is pleasing to find so large a number of Drake's localities still producing the species he met with].

Linum Radiola. Radiola Millegrana Sm. By the side of the hedge, on the right as soon as you come on Bovey Heathfield from Chudleigh. — *L. perenne.* On Withay's Farm, and in most of the dry upland fields about Nutwell. [Doubtless in error for *L. tenuifolium*, the present *L. angustifolium*, which would seem to have been confused with *L. perenne* formerly].

Rhamnus Frangula. Amongst the rocks on the common at the west end of Sticklepath Village.

Sanguisorba officinalis. Among the rushes just before the were at Buckland. [This station comes under Dist. III. of 'Flora of Plymouth'; but, although doubtless correct, I know of no later record for the plant in the locality. Jones & Kingston insert a station by the river Mew in their 'Flora Devoniensis,' on the authority of "MSS. Tour of Sir Francis Drake and Mr. Hudson," a fact of much interest viewed in connection with the association of the two names in the present paper. The *Sanguisorba* is of sparse distribution over the greater part of Devon and Cornwall; apparently very rare indeed in the eastern and midland portions of the latter county, though, peculiarly enough, considering it is a plant belonging to Watson's "intermediate English type," appearing in plenty in some of the rough ground at the Lizard, the most southerly land in Britain].

Rubus Idæus. At the bottom of the wood by the side of the path leading to the waterfall at Lydford.

Myriophyllum spicatum. In the cut that runs round the pond in Mr. Walter's garden at Bicton, in that part near the road. [Whether the restricted *spicatum* of the 'London Catalogue,' ed. 7, or the *alterniflorum* DC., of course doubtful].

Sedum annuum. S. anglicum Huds. On the rocky bank on the

left hand as you go up the hill from Deane, in the road to Plymouth; very frequent on the rocks near and on Dartmoor. [One of those species that especially affect both submaritime and elevated inland localities].

Cotyledon Umbilicus. On the hedge twixt the wood and E. Mead, Nntwell; on all the old walls, Buckland. [Spoken of as a rare plant by Hudson in 'Flora Anglica,' ed. 1, hence perhaps Drake was led to note stations of this abundant south-western species. By the time, however, that Hudson issued ed. 2 he was aware of its being frequent in this part of the country].

Chrysosplenium oppositifolium. About the springs in Torr Village; in the ditch on both 'side' of the wet part of the lane leading from the cross-way to Barton Mead.

Sanicula europæa. By the side of the path thro' the wood as you go from Blindwell Orchard to ye Red Gate, Buckland. [Station also given for *Ajuga reptans* and *Lysimachia nemorum*].

Carum Carui. Below the bridge, Totness.

Pimpinella major. *P. magna* L. Two miles west of Brent, on the left hedge of the road towards Plymouth. [Very possibly Drake was the first to notice it in the county. In the 'Flora Devoniensis' we find the following:—"Hedges in the road between Plymouth and Totness till as far as the 8th mile-stone, Sir Francis Drake and Mr. Hudson." The latter was probably unaware of its occurrence in Devon at the time he published the 2nd ed. of his 'Flora' in 1778].

Rubia anglica. *R. peregrina* L. In Slade Park, in the hedge twixt that and Warren Hill, at the end nearest Ten Acres, Nutwell.

Asperula odorata. In the wood by the side of the path as you go down to the waterfall at Lydford. [Recorded subsequently without any reference to Drake].

Valeriana officinalis. On the left of the road towards Plymouth, on the rocky bank as you go up the hill from Deane; on the left hand hedge twixt Hanger Down Gate and the village of Torr; on the left hand hedge from the Gate at Cholwich Town till you come to the common leading to Tolchmore; on the hedges on both sides the lane from the Milking Court to Great Meadow Gate, and on each side of ye path leading from the Were through Blindwell Orchard, through N. Wood, Buckland. [The stations given for this common plant have the merit of being carefully descriptive ones].

Serratula tinctoria. On the common leading from Cholwich Town to Tolchmoor. [Still a frequent species about Dartmoor, and I have seen it, with *Hieracium pallidum*, growing from the rocks capping one of the very high "tors" of the moor itself].

Solidago Virgaurea. By Tapson's and the Were Pools, in Causey's Meadow at Buckland.

Campanula hederacea. *Wahlenbergia hederacea* Reich. By the side of the hedge-ditch on the right hand, as soon as you come on Bovey Heathfield from Chudleigh; on the sides of the first brook after you enter Tolchmore from Cholwich Town; after you cross the River Mew from Holderwood, twixt the river and Chubtor

Wood, and in the wood by the side of the path leading towards the rock on Roborough Down; near the Were at Buckland, twixt the oke and a stone that stands out of the hedge; on the sides of the little stream that runs by the path leading from Plaistow Down Gate to Moretown. [With the exception of the first station and the Buckland one, the others are situated on the southern border of Dartmoor, where the plant is still common. They belong to the tract of 'Flora of Plymouth,' and are considerably earlier records than any others I have met with for the portions of country to which they respectively belong].

Vinca minor. Twixt Saltash Passage and Plymouth. [This must refer to the older road, on a hedge-bank by which the Periwinkle still grows, within two miles of Plymouth].

Menyanthes trifolia. *M. trifoliata* L. In the lowermost bog going from Limpston to Budly Saltern; on a bog on the left of the road near the coal-work on Bovey Heathfield.

Sibthorpia europæa. About the springs in Torr Village which lyes twixt Hanger Down and Wisdom Bridge. [This station is given as follows in Fl. Dev.:—"About the springs in the village of Tor, near Harford, Sir Francis Drake & Mr. Hudson" (p. 106). The two records doubtless refer to one station, Tor lying near both Hanger Down and Harford].

Bartsia viscosa. On the side of the rivulet that runs by the bog nearest Budley Saltern, and in great plenty in the marshy ground just at the end of the village; on the right hand road-hedge twixt Deane and Ivybridge, towards Plymouth. [The latter station is given in Fl. Dev. as "between Dean and Ivybridge," but without any reference. Drake repeats it for both *Pedicularis sylvatica* and *Rhinanthus Crista-galli*].

Melampyrum sylvaticum. By the side of the path thro' the wood as you go from Blindwell Orchard to the Red Gate, Buckland. [No doubt *M. pratense* L. mistaken for the rarer *M. sylvaticum* L. The two seem to have formerly been confused together, perhaps from a woodland species having had the inappropriate name of *pratense* bestowed on it].

Mentha rotundifolia. At Harberton Ford. [Entry in pencil-markings. Inserted in the same manner are—"In the village of Harberton Ford" against Hudson's *M. spicata*, and "at Harberton" under *M. longifolia*. The latter would seem to be one of the forms of *M. sylvestris* L.; the other I cannot determine].

Scutellaria galericulata. On the bogs on Bovey Heathfield. [Still a plant of the neighbourhood]. — *S. minor*. On the bogs on Woodbury and Limpston Hills; on the bogs on Bovey Heathfield and Tolchmoor. [Quite common in the moorland bogs, in damp places in its neighbourhood, and others of the wilder tracts of country].

Leonurus Cardiaca. Ten-mile stone towards N(ewton) Bushel, on left hand side. [A note in pencil, and whence the distance is calculated not stated].

Anchusa sempervirens. In the village of Ken, on right hand going towards N. Bushel. [A very frequent species about villages in Devon, though probably not an indigenous one].

Symphytum officinale. "In the marsh behind the lime-kiln beyond Exmouth, W. H., 176" (2?). [The last figure indistinct. The initials doubtless stand for those of Wm. Hudson].

Pinguicula lusitanica. On the bog on the left hand of the road twixt the great road to E. Budley and Budley Saltern; by the side of the hedge on the right hand when you come on Bovey Heathfield from Chudleigh; in the bottom on the left hand twixt Dalymore and Cholwich Town; on the bogs on the right of the road on Tolchmore, towards Meavy. [Recently seen at all these stations, or in their neighbourhood].

Lysimachia tenella. Anagallis tenella L. On all the bogs on Woodbury and Limpston Hills; on the bogs on Bovey Heathfield.

Plantago maritima. In the marsh at the mouth of the River Otter, behind the east end of Budley Saltern Beach.

Salicornia europæa. S. herbacea L. In the marsh just beyond the Bowling Green, Nutwell.

Euphorbia Peplis. Among the sand near the first rocks between the Warren and Dawlish. [A species now very rare indeed in Devon and Cornwall, and apparently extinct at some of its recorded stations.] — *E. portlandica.* Near the passage on the sands at Exmouth.

Myrica Gale. About half a mile from the road, following the hedge on the right hand as soon as you come on Bovey Heathfield from Chudleigh, in great plenty; in the bottom on the left hand as you descend the hill to a brook twixt Dalymore and Cholwich Town. [Still grows on Bovey Heathfield. The other station comes under Dist. V. of 'Flora of Plymouth,' and is identical with the two nearly contiguous spots therein mentioned for it, no previous authority being at the time of the publication of that work known for the occurrence of the plant there.

Alisma ranunculoides. In the rivulet that runs thro' the bog nearest Budley Saltern, at the lower end of the bog. [Only two or three stations are recorded for this in Devon].

Narthecium Ossifragum. On all the bogs on Woodbury and Limpston Hills. [This record is (manifestly in error) attached to *Anthericum calyculatum*, the more modern *Tofieldia palustris*, which immediately precedes the *Narthecium* in Hudson's 'Flora].

Schœnus albus. Rhynchospora alba Vahl. On all the bogs on Woodbury and Limpston Hills; on the bogs of Bovey Heathfield.

Scirpus fluitans. In the rivulet that runs thro' the bog nearest Budley Saltern, at the lower end of the bog. — *S. sylvaticus* L. In the wet pit in Causey's Meadow, under the very southernmost end of the orchard-hedge, Buckland. [Probably the station between Lopwell and Denham Bridge, given as an original record under Dist. III. in 'Flora of Plymouth'].

Carex pulicaris L. Amongst the furze in the coarse ground on Withay's Farm, Nutwell.

Phalaris arenaria. Phleum arenarium L. On the sands about Exmouth.

"*Agrostis rubra.* On Withay's Farm, Nutwell, in the field above the (hedge ?)." "Among the heath on the right of the road

from Cholwick Town to Cadover Bridge, on Tolchmore, just after you pass the first brook." [Smith considers the *Agrostis rubra* Huds. to be *Gastridium lendigerum* Gaud.; but the Tolchmore plant is not at all likely to have been this species. If the following note really belongs to *Agrostis canina*, and not to *A. canina* γ. Hudson, the *Agrostis setacea* Curt., I should think it to have been this last, which is an abundant grass on and about Dartmoor]. — *A. canina*. All over Halldown. [True *A. canina* is stated to be common at the present time on Haldon by the Rev. W. Moyle Rogers in his 'Contribution towards a Flora of the Teign Basin']. — *A. stolonifera*. *A. alba* b. *stolonifera*. On the rocks at the end of the warren, towards Dawlish, and beyond the hole in the rocks, Exmouth.

Aira cærulea. *Molinia cærulea* Mœnch. On Tolchmore. — *A. flexuosa* b. *montana*. On Wigvor Down, twixt the gully and the gate leading to Greenvil Farm. [This station belongs to Dist. IV. of 'Flora of Plymouth].

Festuca decumbens. *Triodia decumbens* L. On Tolchmore. [Still a plentiful species, except in the highly cultivated parts; besides occurring on the moors of the cold granitic tracts, it grows on the warm limestone by the coast, as below the Citadel, at Plymouth].

Poa loliacea. *Sclerochloa loliacea* Woods. On the wall under the wood at Nutwell.

Briza media. In the meadow at Limpston leased to Agnes Tipper.

Festuca bromoides. *F. sciuroides* Roth. By the side of the road on the left hand as you get up on Haldown from Exeter; the northernmost road. — *F. ovina*. On Dartmore and Tolchmore.

Ægilops incurva. *Lepturus filiformis* Trin. On the wall twixt the moat and the sea-wall at Nutwell.

Nardus stricta. In great plenty about Cock's Torr, Dartmore.

Trichomanes tunbrigense. *Hymenophyllum tunbrigense* Sm. Under the rocks on Cock's Torr, on the west side, at a spring-head.

Asplenium Ruta-muraria. On the bridge just before you come to Bovey Heathfield; on the bridge over the Dart, beyond Ashburton; on the walls at Buckland House. — *A. marinum*. On the rocks twixt the lane and the sea as you go from East Budley towards the beach, near an oak.

Polypodium Phegopteris. On the side of the hedge on the left of the road twixt Wilsworthy Hamlet and Black Down Gate, just beyond a lane that turns to the left hand. [Quite a local plant about and on Dartmoor].

Lycopodium inundatum. On the bog nearest to Yeatintor, on Woodbury Common. [A very rare plant in Devon, seen on Woodbury at least so recently as 1868 (*vide* Keys's 'Flora of Devon and and Cornwall')]. — *L. Selago*. On the bog nearest to Budley Saltern.

In addition to the above, twenty-one species of Lichens, Fuci, &c., have one or more stations given for them in MS.

NEW PHANEROGAMS PUBLISHED IN PERIODICALS IN BRITAIN DURING 1883.

(Concluded from p. 157).

ELÆOCARPUS ALNIFOLIUS *Baker*. Madagascar. Journ. Linn. Soc. XX. 107. — E. DASYANDRUS *Baker*. Id. 108. — E. QUERCIFOLIUS *Baker*. Id. — E. RHODANTHUS *Baker*. Id. 107. — E. RUFOVESTITUS *Baker*. Id. 106. — E. SERICEUS *Baker*. Id. — E. SUBSERRATUS *Baker*. Id. 105.

ELÆODENDRON OLIGANTHUM *Baker*. Madagascar. Id. 121. — E. PILOSUM *Baker*. Id. 122.

EMBELIA CONCINNA *Baker*. Madagascar. Id. 199. — E. NUMMULARIÆFOLIA *Baker*. Id. 198. — E. SARMENTOSA *Baker*. Id. — E. VILLOSA *Baker*. Id. 199.

EMILIA AMPLEXICAULIS *Baker*. Madagascar. Journ. Linn. Soc. XX. 190.

EPALLAGE HUMIFUSA *Baker*. Madagascar. Id. 189. — E. MINIMA *Baker*. Id.

EPIDENDRUM ENDRESII *Rchb. f.* Costa Rica ? Gard. Chron. xix. 432. —E. INOCENTRUM *Rchb. f.* Id. xx. 8.

ERANTHEMUM BORNEENSE *Hook. f*, Borneo. Bot. Mag. t. 6701.

ERIA AMBROSIA *Hance*. China. Journ. Bot. 232. — E. ELWESII *Rchb. f.* Himalayas. Gard. Chron. xix. 402.

ERIGERON DARRELLIANUS *Hemsley*. Bermudas. Journ. Bot. 104, 257 (t. 239). — E. ELLISII *Hook. f.* Kashmir. Ic. Pl. 1447.

ERIOCAULON FLUITANS *Baker*. Madagascar. Journ. Linn. Soc. xx. 277.

ERIOCHLOA VESTITA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 97.

ERIOSEMA BOJERI *Benth.* ex *Baker*. Madagascar. Journ. Linn. Soc. XX. 133. — E. PROCUMBENS *Benth.* ex *Baker*. Id. 134.

ERYTHROPHLŒUM FORDII *Olir*. China. Ic. Pl. 1409.

ERYTHROXYLUM GERRARDII *Baker*. Madagascar. Journ. Linn. Soc. XX. 109. — E. NITIDULUM *Baker*. Id. 110. — E. PYRIFOLIUM *Baker*. Id. 109.

EUCHARIS SANDERII *Baker*. New Granada. Bot. Mag. t. 6676.

EUGENIA CUNEIFOLIA *Baker*. Madagascar. Journ. Linn. Soc. XX. 144. — E. EMIRNENSIS *Baker*. Id. 145. — E. MICROPODA *Baker*. Id. 144. — E. PARKERI *Baker*. Id. — E. PHILLYREÆFOLIA *Baker*. Id. 145. — E. VACCINIFOLIA *Baker*. Id.

EUPHORBIA ARBUSCULA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 93. — E. EMIRNENSE *Baker*. Madagascar. Journ. Linn. Soc. XX. 251. – E. ENSIFOLIA *Baker*. Id. — E. ERYTHROXYLOIDES *Baker*. Id. 252. — E. OBCORDATA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 93. — E. OBLANCEOLATA *Balf. f.* Id. — E. SOCOTRANA *Balf. f.* Id. — E. TRICHOPHYLLA *Baker*. Madagascar. Journ. Linn. Soc. xii. 250.

EVODIA CELASTRACEA *Baker*. Madagascar. Id. XX. 117.—E. DENSIFLORA *Baker*. Id.

EXACUM AFFINE *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 80. — E. BULBILLIFERUM *Baker*. Madagascar. Journ. Linn. Soc. XX. 209. — E. CÆRULEUM *Balf. f.* Socotra. Proc. R. S. Edinb.

xii. 80. — E. GRACILIPES *Balf. f.* Id. — E. ROSULATUM *Baker.* Madagascar. Journ. Linn. Soc. xx. 210. — E. SPATHULATUM *Baker.* Id.

EXOCARPUS XYLOPHYLLOIDES *Baker.* Id. 249.

FAUREA FORFICULIFLORA *Baker.* Madagascar. Id. 243.

FICUS BARONI *Baker.* Madagascar. Id. 262. — F. BRACHYCLADA *Baker.* Id. 259. — F. CLAOXYLOIDES *Baker.* Id. 260. — F. LONGIPES *Baker.* Id. 259. — F. MARMORATA *Bojer* ex *Baker.* Id. 257. — F. MASONI *Horne* [*Baker*]. Fiji. Id. 371. — F. MELLERI *Baker.* Madagascar. Id. 258. — F. SMITHII *Horne* [*Baker*]. Fiji. Id. 372. — F. SOCOTRANA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 96. — F. SOROCEOIDES *Baker.* Madagascar. Journ. Linn. Soc. xx. 258. – F. TRICHOPODA *Baker.* Id. 261. — F. TRICHOSPHÆRA *Baker.* Id. — F. XIPHOCUSPIS *Baker.* Id. 260.

FIMBRISTYLIS CINEREA *Ridley.* Madagascar. Id. 335.

FINTELMANNIA SETIFERA *Ridley.* Madagascar. Id. 337.

FLAGELLARIA GIGANTEA *Hook. f.* Polynesia. Ic. Pl. 1429.

*FORSYTHIOPSIS BARONI *Baker.* (Acanthaceæ Ruellieæ). Madagascar. Journ. Linn. Soc. xx. 219 (t. 27).

FRAXINUS MARIESII *Hook, f.* N. China. Bot. Mag. t. 1678.

GÆRTNERA ARENARIA *Baker.* Madagascar. Journ. Linn. Soc. xx. 209. — G. MACROBOTRYS *Baker.* Id. 208. — G. MACROSTIPULA *Baker.* Id. 207. — G. PHYLLOSEPALA *Baker.* Id. — G. SPHÆROCARPA *Baker.* Id. 208.

GALEANDRA HARVEYANA *Rchb. f.* Gard. Chron. xx. 716.

GARCINIA MELLERI *Baker.* Madagascar. Journ. Linn. Soc. xx. 92. —G. PAUCIFLORA *Baker.* Id.

GARDENIA GORDONI *Baker.* Fiji. Id. 361. — G. GORRIEI *Horne* [*Baker*]. Id. 362. — G. GRIEVEI *Horne* [*Baker*]. Id. 361. — G. HILLII *Horne* [*Baker*]. Id. 362. — G. STORCKII *Oliv.* Fiji. Ic. Pl. 1448.

GENISTA ? MADAGASCARIENSIS *Baker.* Madagascar. Journ. Linn. Soc. xx. 125.

GENTIANA BORNEENSIS *Hook. f.* Borneo. Ic. Pl. 1440. — G. DELICATA *Hance.* China. Journ. Bot. 324. — G. LODERI *Hook. f.* Kashmir. Ic. Pl. 1440. — G. ROBUSTA *King* [*Hook. f.*]. Tibet. Id. 1439. G. TIBETICA *King* [*Hook. f.*]. Id. 1441.

GERBERA HYPOCHŒRIDOIDES *Baker.* Madagascar. Journ. Linn. Soc. xx. 193.

GERRARDANTHUS TOMENTOSUS *Hook. f.* Natal. Bot. Mag. t. 6694.

GRADERIA FRUTICOSA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 84.

GREWIA LANCEOLATA *Baker.* Madagascar. Journ. Linn. Soc. xx. 104. — G. POLYPYRENA *Baker.* Id. 105.

GYMNEMA MACRANTHUM *Hook. f.* Sikkim Himalaya. Ic. Pl. 1436.

GYMNOSPORIA BERBERIDACEA *Baker.* Madagascar. Journ. Linn. Soc. xx. 120. — G. CRATÆGINA *Baker.* Id. — G. PANICULATA *Baker.* Id. 121.

HABENARIA SOCOTRANA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 96.

HÆMANTHUS GRANDIFOLIUS *Balf. f.* Socotra. Id.

HALLERIA TETRAGONA *Baker.* Madagascar. Journ. Linn. Soc. xx. 214.

HAPLOCARPHA LEICHTLINII *N. E. Br.* S. Africa. Gard. Chron. xix. 78.

HARTOGIA TRILOBOCARPA *Baker*. Madagascar. Journ. Linn. Soc. xx. 119.

HEDYCHIUM PEREGRINUM *N. E. Br.* Madagascar. Gard. Chron. xix. 368.

HELEOCHARIS BARONI *Baker*. Madagascar. Journ. Linn. Soc. xx. 297.

HELICHRYSUM AMPLEXICAULE *Baker*. Madagascar. Id. 185. — H. BULLATUM *Baker*. Id. 184. — H. CRYPTOMERIOIDES *Baker*. Id. 186. — H. FLAGELLARE *Baker*. Id. 183. — H. PATULUM *Baker*. Id. 185. — H. SQUARROSUM *Baker*. Id. 184. — H. TANACETIFOLIUM *Baker*. Id. 183. — H. TRINERVATUM *Baker*. Id. 182.

HELIOTROPIUM DENTATUM *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 81. — H. NIGRICANS *Balf. f.* Id. — H. ODORUM *Balf. f.* Id.

HEMICAREX CURVIROSTRIS *C. B. Clarke*. Himalaya. Journ. Linn. Soc. xx. 384. — H. FILICINA *C. B. Clarke*. Id. — H. PYGMÆA *C. B. Clarke*. Id. 383.

HIBISCUS ELLISII *Baker*. Madagascar. Journ. Linn. Soc. xx. 100. —H. OXALIFLORUS *Bojer* ex *Baker*. Id. 99.

HOMALIUM PARKERI *Baker*. Madagascar. Id. 150.

HYACINTHUS CRYPTOPODUS *Baker*. Madagascar. Id. 274.

HYDNOPHYTUM WILKINSONI *Horne* [*Baker*]. Fiji. Journ. Linn. Soc. xx. 365. — H.? WILSONI *Horne* [*Baker*]. Id.

HYDROCOTYLE TUSSILAGINIFOLIA *Baker*. Madagascar. Id. 151.

HYPOESTES BRACHIATA *Baker*. Madagascar. Id. 224. — H. CALAMINTHOIDES *Baker*. Id. 223. — H. COMORENSIS *Baker*. Id. — H. CORYMBOSA *Baker*. Id. — H. LONICEROIDES *Baker*. Id. 225. H. PUBESCENS *Balf. f.* Socotra. Proc, R. S. Edinb. xii. 89. — H. SECUNDIFLOBA *Baker*. Madagascar. Journ. Linn. Soc. xx. 224.

ILEX MYRIADENIA *Hance*. China. Journ. Bot. 296.

ILLIGERA RHODANTHA *Hance*. China. Id. 321.

IMPATIENS COMORENSIS *Baker*. Madagascar. Journ. Linn. Soc. xx. 114. — I. EMIRNENSIS *Baker*. Id. 115. — I. FIRMULA *Baker*. Id. 114. — I. LYALLII *Baker*. Id. 113. — I. SALICIFOLIA *Baker*.* Id. 114. — I. TRICHOCERAS *Baker*. Id. 115.

INDIGOFERA KIRKII *Oliv*. Zanzibar. Ic. Pl. 1416. — I. LYALLI *Baker*. Madagascar. Journ. Linn. Soc. xx. 128. — I. PARKERI *Baker*. Id. 126. — I. PECTINATA *Baker*. Id. 127. — I. PINIFOLIA *Baker*. Id. — I. THYMOIDES *Baker*. Id. 126.

IPHIGENIA ROBUSTA *Baker*. Madagascar. Id. 275.

IPOMÆA LACINIATA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 82.— I. RIEDELIANA *Oliv*. Indian Archipelago. Ic. Pl. 1424. — I. THOMSONIANA *Mast*. E. Indies. Gard. Chron. xx. 818, fig. 147.

IRIS BARTONI *M. Foster*. Kandahar. Id. xix. 275. — I. MILESII *Baker* [*M. Foster*]. Himalayas. Id. 231.

*ISCHNURUS PULCHELLUS, *Balf. f.* (Gramineæ Hordeæ). Socotra. Proc. R. S. Edinb. xii. 98.

ISOGLOSSA JUSTICIOIDES *Baker*. Madagascar. Journ. Linn. Soc. xx. 221.

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* [This name is preoccupied, Hook. f. & Thomson having given it to an Indian species: the Madagascar plant might well be called *I. Bojeriana*, Bojer having distributed it as *Balsamina salicifolia*.—ED. JOURN. BOT.]

IXORA CAREWI *Horne* [*Baker*]. Fiji. Id. 364. — I. JOSKEI *Horne* [*Baker*]. Id. 363.

JASMINUM MICROCALYX *Hance*. China. Journ. Bot. 323. — J. PUBERULUM *Baker*. Madagascar. Id. 203. — J. ROTUNDIFOLIUM *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 77.

JATROPHA UNICOSTATA *Balf. f.* Socotra. Id. 94.

JUSTICIA CHLOROPTERA *Baker*. Madagascar. Journ. Linn. Soc. XX. 222. — J. RHODOPTERA *Baker*. Id. 221. — J. RIGIDA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 87.

KALANCHÆ PUMILA *Baker*. Madagascar. Journ. Linn. Soc. XX. 139. — K. TRICHANTHA *Baker*. Id. 140.

KITCHINGIA AMPLEXICAULIS *Baker*. Madagascar. Id. 142. — K. PANDURIFORMIS *Baker*. Id. 141. — K. PARVIFOLIA *Baker*. Id. — K. PELTATA *Baker*. Id. 140.—K. PORPHYROCALYX *Baker*. Id. 142.

KNIPHOFIA LEICHTLINII [*Baker MSS.*] *Hook. f.* Abyssinia. Bot. Mag. t. 6716. — K. PALLIDIFLORA *Baker*. Madagascar. Journ. Linn. Soc. XX. 273.

KOBRESIA NITENS *C. B. Clarke*. Kashmir. Id. 379. — K. PSEUDOLAXA *C. B. Clarke*. Id. 381.

KOSTELETSKYA HISPIDA *Baker*. Madagascar. Id. 98.

LASIOCOMYS FLAGELLIFERA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 92. — L. SPICULIFOLIA *Balf. f.* Id.

LASIOSIPHON SOCOTRANUS *Balf. f.* Socotra. Id. 92.

LASIOSTELMA SANDERSONI *Oliv.* Natal. Ic. Pl. 1449.

LEBECKIA? RETAMOIDES *Baker*. Madagascar. Journ. Linn. Soc. XX. 123.

LEPTOLÆNA PAUCIFLORA *Baker*. Madagascar. Id. 96. — L. TURBINATA *Baker*. Id. 97.

LEPTURUS TENUIS *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 97.

LEUCAS VIRGATA *Balf. f.* Socotra. Id. 91.

LIGHTFOOTIA SUBAPHYLLA *Baker*. Madagascar. Journ. Linn. Soc. XX. 193.

LIPARIS CHLOROXANTHA *Hance*. China. Journ. Bot. 231. — L. GROSSA *Rchb. f.* Birma. Gard. Chron. xix. 110.

LIPPIA OLIGOPHYLLA *Baker*. Madagascar. Journ. Linn. Soc. XX. 225.

LITSEA VERTICILLATA *Hance*. China. Journ. Bot. 356.

LOPHATHERUM GEMINATUM *Baker*. Madagascar. Journ. Linn. Soc. XX. 300.

LORANTHUS DIPLOCRATER *Baker*. Madagascar. Id. 246. — L. GONOCLADUS *Baker*. Id. 247. — L. NOTOTHIXOIDES *Hance*. China. Journ. Bot. 356. — L. MICROLIMBUS *Baker*. Madagascar. Journ. Linn. Soc. XX. 246. — L. MONOPHLEBIUS *Baker*. Id. 247. — L. PARKERI *Baker*. Id. 245. — L. RUBRO-VIRIDIS *Baker*. Id.

*LYGISURA ANGUSTIFOLIA *Hook f.* (*Marsdenia angustifolia* Wight.). (Asclepiadeæ Marsdenieæ), Burma. Ic. Pl. 1423.

LYSIMACHIA PARVIFLORA *Baker*. Madagascar. Journ. Linn. Soc. XX. 196.

MABA LATERIFOLIA *Horne* [*Hiern*]. Fiji. Id. 366.

MACARANGA ALNIFOLIA *Baker*. Madagascar. Id. 256. — M. ECHINOCARPA *Baker*. Id. 255. — M. MACROPODA *Baker*. Id. 257. — M. SPHÆROPHYLLA *Baker*. Id.

Mæsa trichophlebia *Baker*. Madagascar. Id. 197.
Marsdenia robusta *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 79.
Masdevallia brevis *Rchb. f.* Demerara. Gard. Chron. xx. 588.—M. calura *Rchb. f.* Id. 230.—M. Carderi *Rchb. f.* Id. xix. 784; xx. 181, fig. 30. — M. Chestertoni *Rchb. f.* Columbia. Id. xix. 532. — M. Gaskelliana *Rchb. f.* Id. xx. 294. — M. gemmata *Rchb. f.* Id. — M. marginella *Rchb. f.* Id. 38.—M. porcelliceps *Rchb. f.* Id. xix. 10.—M. torta *Rchb. f.* Id. 110. — M. trichæte *Rchb. f.* Id. xx. 360. — M. tridactylites *Rchb. f.* Id. xix. 784.
Maxillaria irrorata *Rchb. f.* Andes? Id. xx. 102.—M. varicosa *Rchb. f.* Bolivia. Id. 392.
Medinilla Curtisii *Hook f.* Sumatra. Id. xx. 621, fig. 108; Bot. Mag. t. 6730. — M. divaricata *Baker*. Madagascar. Journ. Linn. Soc. xx. 149.—M. fasciculata *Baker*. Id.—M. papillosa *Baker*. Id. 148. — M. parvifolia *Baker*. Id. 149.
Melodinus vitientis *Rolfe*. Journ. Bot. 201.
Memecylon longicuspe *Baker*. Madagascar. Journ. Linn. Soc. xx. 150.
Mesembryanthemum platyphyllum *Baker*. Madagascar. Id. 278.
Microglossa mikanioides *Baker*. Madagascar. Id. 182. — M. psiadioides *Baker*. Id.
Micromeria flagellaris *Baker*. Madagascar. Id. 232.—M. sphærophylla *Baker*. Id.
*Microsteira Curtisii *Baker* (Malpighiaceæ). Madagascar. Id. 111.
Mimulopsis diffusa *Baker*. Madagascar. Id. 219. — M. lanceolata *Baker*. Id. 220.
*Mitolepis intricata *Balf. f.* (Asclepiadeæ Periploceæ). Socotra. Proc. R. S. Edinb. xii. 78.
Mitostemma Glaziovii *Mast.* Brazil. Journ. Bot. 34. — M. Jenmanii *Mast.* Brit. Guiana. Id.
*Monachochlamys flagellaris *Baker* (Acanthaceæ Thunbergieæ). Madagascar. Journ. Linn. Soc. xx. 217 (t. 26).
Mucuna paniculata *Baker*. Madagascar. Id. 132.
Mundulea revoluta *Baker*. Madagascar. Id. 129.
Mussænda trichophlebia *Baker*. Madagascar. Id. 166.—M. vestita *Baker*. Id.
Myosurandra moschata *Baker*. Madagascar. Id. 143.
Myrica adenophora *Hance*. China. Journ. Bot. 357.—M. Bojeriana *Baker*. Madagascar. Journ. Linn. Soc. xx. 267. — M. phillyreæfolia *Baker*. Id.
Neuracanthus aculeatus *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 86. — N. capitatus *Balf. f.* Id.
Obetia laciniata *Baker*. Madagascar. Journ. Linn. Soc. xx. 264.—O. morifolia *Baker*. Id. 263.—O. pinnatifida *Baker*. Id. 264.
Ocotea acuminata *Baker*. Madagascar. Id. 242. — O. trichophlebia *Baker*. Id.
Oncidium Brunleesianum *Rchb. f.* Gard. Chron. xix. 340. — O. eurycline *Rchb. f.* Id. xx. 812.—O. Hrubyanum *Rchb. f.* Id. xix. 562.—O. Jonesianum *Rchb. f.* Paraguay. Id. xx. 781.—O. litum *Rchb. f.* "n. sp. vel hybr. nat." Brazil. Id. 328. —

O. MONACHICUM *Rchb. f.* N. Grenada. Id. xix. 368, fig. 54. — O. SALTABUNDUM *Rchb. f.* Id. 720. — O. USTULATUM *Rchb. f.* Columbia. Id. 340.

ONCOSTEMUM ARTHRITICUM *Baker.* Madagascar. Journ. Linn. Soc. xx. 203. — O. PEDICELLATUM *Baker.* Id. 202. — O. PHYLLANTHOIDES *Baker.* Id. 203.

OREOCHARIS FILIPES *Hance.* China. Journ. Bot. 166.

ORTHOSIPHON FERRUGINEUS *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 91.

OSYRIS PENDULA *Balf. f.* Socotra. Id. 93.

OTIOPHORA PAUCIFLORA *Baker.* Madagascar. Journ. Linn. Soc. xx. 170.

OXALIS SIMULANS *Baker.* Madagascar. Id. 112.—O. VILLOSA *Baker.* Id. — O. XIPHOPHYLLA *Baker.* Id.

PANAX CISSIFLORUS *Baker.* Madagascar. Id. 154. — P. ORNIFOLIUS *Baker.* Id. 155. — P. TRIPINNATUS *Baker.* Id. 153. — P. ZANTHOXYLOIDES *Baker.* Id. 154.

PANICUM RIGIDUM *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 97.

PAPAVER HOOKERI *Baker in Hort. Kew.* [*Hook. fil.*]. Kashmir. Bot. Mag. t. 6729.

PARKIA PARRII *Horne* [*Baker*]. Fiji. Journ. Linn. Soc. xx. 359.

PASSIFLORA DEFICIENS *Mast.* Brit. Guiana. Journ. Bot. 34. — P. IANTHINA *Mast.* Bolivia. Id. 36. — P. KALBREYERI *Mast.* N. Grenada. Id. — P. PAVONIS *Mast.* Mexico. Id. 35. — P. PLATYSTYLA *Mast.* Brazil. Id.

PAVONIA MACROTIS *Baker.* Madagascar. Journ. Linn. Soc. xx. 98. — P. PLATANIFOLIA *Baker.* Id. 99.

PAYENA HILLII *Horne* [*Baker*]. Fiji. Id. 368.

PEDDIEA INVOLUCRATA *Baker.* Madagascar. Id. 244.

PENTAS MUSSÆNDOIDES *Baker.* Madagascar. Id. 165.

PEPEROMIA BARONI *Baker.* Madagascar. Id. 239.

PERISTERIA EPHIPPIUM *Rchb. f.* W. South America. Gard. Chron. xx. 198.

*PETROCODON DEALBATUS *Hance* (Cyrtandreæ). China. Journ. Bot. 167.

*PETRÆOVITEX RIEDELII *Oliv.* (Verbenaceæ Viticeæ). Indian Archipelago. Ic. Pl. 1420.

PHALÆNOPSIS BOXALLII *Rchb. f.* Philippines. Gard. Chron. xix. 274. — P. VALENTINI "n. sp. (hyb. nat.?)" *Rchb. f.* Malaya. Id. xx. 262.

PHARNACEUM SUFFRUTICOSUM *Baker.* Madagascar. Journ. Linn. Soc. xx. 151.

PHILIPPIA MACROCALYX *Baker.* Madagascar. Id. 195.—P. OOPHYLLA *Baker.* Id.

PHYLLANTHUS FILIPES *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 94.

PILEA LONGIFOLIA *Baker.* Madagascar. Journ. Linn. Soc. xx. 266. — P. MACRODONTA *Baker.* Id. — P. MODESTA *Baker.* Id. 265.

PIMPINELLA BISECTA *Baker.* Madagascar. Id. 152.—P. EBRACTEATA *Baker.* Id. — P. TENUICAULIS *Baker.* Id. 153.

*PLAGIOLIRION HORSMANI *Baker* (Amaryllidaceæ). Columbia. Gard. Chron. xx. 38, 105, fig. 16.

PLECTRANTHUS HEXAPHYLLUS *Baker*. Madagascar. Journ. Linn. Soc. XX. 231. — P. LAVANDULOIDES *Baker*. Id. 230.
PLECTRONIA DENSIFLORA *Baker*. Madagascar. Id. 167. — P. MACGREGORI *Horne* [*Baker*]. Fiji. Id. 363. — P. UMBELLATA *Baker*. Madagascar. Id. 168.
PODOCARPUS ARGOTÆNIA *Hance*. China. Journ. Bot. 357.
PODOPHYLLUM PLEIANTHUM *Hance*. China. Id. 175.
POGONIA GAMMIEANA *Hook. f.* N. India. Bot. Mag. t. 6671.
POLYGALA EMIRNENSIS *Baker*. Madagascar. Journ. Linn. Soc. XX. 89. — P. MUCRONATA *Baker*. Id.
POLYGONUM BRACHYPODUM *Baker*. Madagascar. Id. 239. — P. FORBESI *Hance*. China. Journ. Bot. 100.
POLYSTACHYA MINUTIFLORA *Ridley*. Madagascar. Journ. Linn. Soc. XX. 332. — P. ROSELLATA *Ridley*. Id.
PORANA OBTUSA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 83.
POTAMOGETON CHEESEMANII *A. Bennett*. N. Zealand. Journ. Bot. 66. — P. GRIFFITHII *A. Bennett*. Wales. Id. 65.
*PRIMULINA TABACUM *Hance* (Cyrtandraceæ). China. Journ. Bot. 169.
PSIADIA SALVIÆFOLIA *Baker*. Madagascar. Journ. Linn. Soc. XX. 181. — P. URTICÆFOLIA *Baker*. Id.
PSOROSPERMUM BRACHYPODUM *Baker*. Madagascar. Id. 93. — P. FERROVESTITUM *Baker*. Id. — P. FORBESII *Baker*. Id. 94. — P. MICROCARPUM *Baker*. Id. 95. — P. PAUCIFLORUM *Baker*. Id. 94. — P. VENULOSUM *Baker*. Id. 93.
PSYCHOTRIA TERNIFOLIA *Baker*. Madagascar. Id. 169. — P. TRICHANTHA *Baker*. Id.
RENEALMIA AFRICANA *Benth.* [*Hook. f.*]. W. Trop. Africa. Ic. Pl. t. 1430. — R. MANNII *Hook. f.* Id.
RHAPTOPETALUM SOYAUXII *Oliv.* Trop. Africa. Ic. Pl. 1405.
RHINACANTHUS SCOPARIUS *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 88.
RHYNCHELYTRUM MICROSTACHYUM *Balf. f.* Id. 97.
RHYNCHOSIA RHODOPHYLLA *Baker*. Madagascar. Journ. Linn. Soc. XX. 133. — R. VERSICOLOR *Baker*. Id. 132.
*RIEDELIA CURVIFLORA *Oliv.* (Scitamineæ Zingibereæ). Indian Archipelago. Ic. Pl. 1419.
RODRIGUEZIA CALOPLECTRON *Rchb. f.* N. Grenada. Gard. Chron. XIX. 368. — R. LŒCANA *Rchb. f.* Id. XX. 38. — R. LEHMANNI *Rchb. f.* Ecuador. Id. XIX. 403.—R. LUTEOLA *N. E. Br.* Id. 688.
RUBUS FORDII *Hance*. China. Journ. Bot. 298. — R. MYRIANTHUS *Baker*. Madagascar. Journ. Linn. Soc. 136. — R. PAUCIFLORUS *Baker*. Id.
RULINGIA MADAGASCARIENSIS *Baker*. Madagascar. Id. XX. 104.
RUELLIA CARNEA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 85. — R. INSIGNIS *Balf. f.* Id.
SACCOLABIUM BERKELEYI *Rchb. f.* India. Gard. Chron. XIX. 814.— S. WITTEANUM *Rchb. f.* Java. Id. 618.
SALVIA PARVIFOLIA *Baker*. Madagascar. Journ. Linn. Soc. XX. 232.
SARCANTHUS BELOPHORUS *Rchb. f.* Gard. Chron. XX. 262.

? SARCOPODIUM DEAREI. Id. 108, fig. 17. "Whether a published name we have not ascertained."

*SCHISMATOCLADA PSYCHOTRIOIDES *Baker* (Rubiaceæ Cinchoneæ). Journ. Linn. Soc. xx. 160 (t. 160).

SCHIZOTÆNA EXINVOLUCRATA *Baker*. Madagascar. Id. 97.

SCHÆNOXIPHIUM BURKEI *C. B. Clarke*. S. Africa. Id. 386.

SCILLA LIVIDA *Baker*. Cape. Gard. Chron. xx. 166.

SCIRPUS LYALLII *Baker*. Madagascar. Journ. Linn. Soc. xx. 297. — S. MULTICOSTATUS *Baker*. Id. 298. — S. TRICHOBASIS *Baker*. Id.

SECAMONE SOCOTRANA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 79.

SELAGO CAPITULIFLORA *Rolfe*. Cape. Journ. Linn. Soc. xx. 355.— S. CONGESTA *Rolfe*. Id. 356. — S. DREGEI *Rolfe*. Id. 353. — S. MURALIS *Benth. & Hook. f. ex Rolfe*. Madagascar. Id. 235. S. NIGRESCENS *Rolfe*. Cape. Id. 352. — S. NUTANS *Rolfe* (*S. cephalophora* Meyer, non Thunb.). Id. 354.

SENECIO ANAMPOZA *Baker*. Madagascar. Id. 191. — S. CURVATUS *Baker*. Id. 190. — S. MULTIBRACTEATUS *Baker*. Id. 192. — S. PARKERI *Baker*. Id. 191. — S. POLYRHIZUS *Baker*. Id. 192.

*SIBANGEA ARBORESCENS *Oliv.* (Euphorbiaceæ Phyllantheæ). Trop. Africa. Ic. Pl. 1411.

SIDEROXYLON FIMBRIATUM *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 76.

SIEGESBECKIA EMIRNENSIS *Baker*. Madagascar. Journ. Linn. Soc. xx. 188.

SIGMATOSTALIX MALLEIFERA *Rchb. f.* N. Granada. Gard. Chron. xx. 360.

*SOCOTORA APHYLLA *Balf. f.* (Apocyneæ). Socotra. Proc. R. S. Edinb. xii. 77.

SOLANUM APOCYNIFOLIUM *Baker*. Madagascar. Journ. Linn. Soc. xx. 213. — S. FLAGELLIFERUM *Baker*. Id. — S. SEEDII *Horne* [*Baker*]. Fiji. Id. 369.

SPARMANNIA DISCOLOR *Baker*. Madagascar. Id. 102. — S. SUBPALMATA *Baker*. Id. 101.

STACHYS DEBILIS *Baker*. Madagascar. Id. 234. — S. OLIGANTHA *Baker*. Id. 233. — S. SPHÆRODONTA *Baker*. Id.

STATICE LEFROYI *Hemsley*. Bermudas. Journ. Bot. 105.

STELIS ZONATA *Rchb. f.* Demerara. Gard. Chron. xx. 556.

STENOCLINE FERRUGINEA *Baker*. Madagascar. Journ. Linn. Soc. xx. 187. — S. FRUTICOSA *Baker*. Id. 186. — S. INCANA *Baker*. Id. 187.

STENOTAPHRUM OOSTACHYUM *Baker*. Madagascar. Id. 299. — S. UNILATERALE *Baker*. Id.

STIPA MADAGASCARIENSIS *Baker*. Madagascar. Id. 300.

STROBILANTHES DIMORPHOTRIDENS *Hance*. China. Journ. Bot. 355. —S. MADAGASCARIENSIS *Baker*. Madagascar. Journ. Linn. Soc. xx. 220.

SWERTIA KINGII *Hook. f.* Sikkim Himalaya. Ic. Pl. 1442.

SYMPHONIA EUGENIOIDES *Baker*. Journ. Linn. Soc. xx. 91. — S. LEPIDOCARPA *Baker*. Id. — S. MELLERI *Baker*. Id. 90. — S. PAUCIFLORA *Baker*. Id.

SYMPLOCOS ADENOPUS *Hance*. China. Journ. Bot. 322.
TABERNÆMONTANA SESSILIFOLIA *Baker*. Madagascar. Journ. Linn. Soc. xx. 205. — T. THURSTONI *Horne* [*Baker*]. Fiji. Id. 368.
TACSONIA INFUNDIBULARIS *Mast*. Venezuela. Journ. Bot. 34.
TAMBOURISSA ROTA *Baker*. Madagascar. Journ. Linn. Soc. xx. 240. — T. TRICHOPHYLLA *Baker*. Id.
TANACETUM JOHNSTONII *Hemsley*. Afghanistan. Journ. Bot. 135.
TEPHROSIA MONANTHA *Baker*. Madagascar. Journ. Linn. Soc. xx. 128. — T. PLICATA *Oliv*. S. Africa. Ic. Pl. 1445.
TETRACERA PAUCIFLORA *Baker*. Madagascar. Journ. Linn. Soc. xx. 88.
*TETRASPIDIUM LAXIFLORUM *Baker* (Scrophulariaceæ Gerardieæ). Madagascar. Id. 215 (t. 25).
TEUCRIUM PETIOLARE *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 92. —T. PROSTRATUM *Balf. f.* Id.
THUNBERGIA KIRKII *Hook. f.* E. Trop. Africa. Bot. Mag. t. 6677. — T. PLATYPHYLLA *Baker*. Madagascar. Journ. Linn. Soc. xx. 216.
*THURNIA JENMANI *Hook. f.* (Juncaceæ Eujunceæ). British Guiana. Ic. Pl. 1408. — T. SPHÆROCEPHALA *Hook. f.* (*Mnasium sphærocephalum* Rudge). Brit. Guiana. Id. 1407.
TODDALIA SCHMIDELIOIDES *Baker*. Madagascar. Journ. Linn. Soc. xx. 118.
TOURNEFORTIA PUBERULA *Baker*. Madagascar. Id. 211.
*TOXANTHERA NATALENSIS *Hook. f.* (Cucurbitaceæ Cucumerineæ). Natal. Ic. Pl. 1421.
TRAGIA DIOICA *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 95.
TREMA GRISEA *Baker*. Madagascar. Journ. Linn. Soc. xx. 263.
*TREUTLERA INSIGNIS *Hook. f.* (Asclepiadeæ Marsdenieæ). Sikkim. Ic. Pl. 1425.
TRIASPIS NELSONI *Oliv*. Transvaal. Id. 1418.
*TRICHOCALYX OBOVATUS *Balf. f.* (Acanthaceæ). Socotra. Proc. R. S. Edinb. xii. 88. — T. ORBICULATUS *Balf. f.* Id.
TRICHOCENTRUM ORTHOPLECTRUM *Rchb. f.* Gard. Chron. xix. 562.
TRICHODESMA LAXIFLORUM *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 81. — T. MICROCALYX *Balf. f.* Id. — T. SCOTTI *Balf. f.* Id.
TRICHOGLOTTIS COCHLEARIS *Rchb. f.* Sumatra. Gard. Chron. xix. 142.
TRICHOPILIA KIENASTIANA *Rchb. f.* Id. xx. 166.
TROCHETIA PENTAGLOSSA *Baker*. Madagascar. Journ. Linn. Soc. xx. 142.
TULIPA AUCHERIANA *Baker*. Persia. Gard. Chron. xx. 168. — T. CRUCIATA *Baker*. Asia Minor. Id. xix. 788. — T. ELWESII *Baker*. Teheran. Id. — T. LOWNEI *Baker*. Palestine. Id. xx. 234. — T. MACROSPEILA *Baker*. Id. 11.
TYLOPHORA MICROSTACHYS *Hook. f.* Tenasserim, Ic. Pl. 1450.
UAPACA DENSIFOLIA *Baker*. Madagascar. Journ. Linn. Soc. xx. 252.
URERA OLIGOLOBA *Baker*. Madagascar. Id. 265.
UROPHYLLUM LYALLII *Baker*. Madagascar. Id. 165.

Utricularia lingulata *Baker*. Madagascar. Id. 216.—U. Parkeri *Baker*. Id. — U. spartea *Baker*. Id.
Vangueria emirnensis *Baker*. Madagascar. Id. 168.
Vanilla Pfaviana *Rchb. f.* Mexico. Gard. Chron. xx. 230.
Veprecella vestita *Baker*. Madagascar. Journ. Linn. Soc. xx. 146.
Vernonia aphanantha *Baker*. Madagascar. Id. 176.—V. apocyniifolia *Baker*. Id. 175. — V. arguta *Baker*. Id. — V. Baroni *Baker*. Id. 173. — V. brachyscypha *Baker*. Id. 178. — V. delapsa *Baker*. Id. 172. — V. dissoluta *Baker*. Id. 174. — V. fusco-pilosa *Baker*. Id. 179.— V. inulæfolia *Baker*. Id. 180. —V. leucophylla *Baker*. Id. 176.—V. Lyallii *Baker*. Id. 174. —V. moquinioides *Baker*. Id. 177. — V. ochroleuca *Baker*. Id. 179.—V. pachyclada *Baker*. Id. 178.—V. piptocarphioides *Baker*. Id. 177. — V. quadriflora *Baker*. Id. 173. — V. rhaponticoides *Baker*. Id. 180. — V. sparsiflora *Baker*. Id. 172.
Vinca trichophylla *Baker*. Madagascar. Id. 204.
Vincetoxicum linifolium *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 79.
Viscum echinocarpum *Baker*. Madagascar. Journ. Linn. Soc. xx. 248.—V. multicostatum *Baker*. Id.—V. myriophlebium *Baker*. Id.—V. pentanthum *Baker*. Id. 249.
Vitex ibarensis *Baker*. Madagascar. Id. 226.—V. Melleri *Baker*. Id. 227.—V. pachyclada *Baker*. Id.—V. phillyræfolia *Baker*. Id. 226.
Vitis lenticellata *Baker*. Madagascar. Id. 122.—V. triternata *Baker*. Id. 123.
Vogelia pendula *Balf. f.* Socotra. Proc. R. S. Edinb. xii. 76.
Warscewiczella picta *Rchb. f.* Gard. Chron. xx. 8.
Weinmannia floribunda *Baker*. Madagascar. Journ. Linn. Soc. xx. 138.
Wightia borneensis *Hook. f.* Ic. Pl. 1444.
Withania Riebeckii *Schweinf*, Socotra. Proc. R. S. Edinb. xii. 83.
Wormia artocarpifolia *Baker*. Madagascar. Journ. Linn. Soc. xx. 88.
Xerophyta spinulosa *Ridley*. Madagascar. Id. 333.
*Xylocalyx asper *Balf. f.* (Scrophularineæ Gerardieæ). Socotra. Proc. R. S. Edinb. xii. 85.
Xyris semifuscata *Bojer ex Baker*. Madagascar. Journ. Linn. Soc. xx. 277.
Zygopetalum Burkei *Rchb. f.* Demerara. Gard. Chron. xx. 684.
—Z. forcipetalum *Rchb. f.* Id. 360.

NOTICES OF BOOKS.

In 'The Sagacity and Morality of Plants' (Chatto & Windus) Mr. J. E. Taylor deals in a popular way with some of the phenomena of plant-life with which Mr. Darwin did so much to make us

familiar. The practice of some recent writers who "speak of plants adopting this habit or that device as if they did it of set and intelligence" is justly characterised by Mr. Taylor as "a new language"; and he not unreasonably thinks that, "whether we believe in the consciousness of plant-life or not, this language almost implies such a belief." That "there is hardly a virtue or a vice which has not its counterpart in the actions of the vegetable kingdom," and that the "principle of altruistic morality applies to it," may be taken as examples of the somewhat startling axioms enunciated by Mr. Taylor; but, apart from these and from the somewhat sensational headings of his chapters, there is much in the book which will interest and instruct the general reader. An occasional slip may be noted: such as that at p. 57, where the "Air-plant" of cottage-windows (*Saxifraga sarmentosa*) is called *Bryophyllum proliferum*; or (p. 125) the lettering a cut of *Oxalis stricta* as *O. Acetosella*.

Mr. Grant Allen's 'Flowers and their Pedigrees' (Longmans, Green & Co.) has hitherto remained unnoticed. It has all the merits of his previous works, not the least of which is a charming literary style; while it also possesses the same tone of liberal assumption and superiority to the trammels of fact. Thus, on a single page (p. 86) we are told that "the marshy Comarum has assumed a dingy purplish yellow hue, to suit the eyes of marsh-land insects"; that "waterside flies do not seem to care for yellow, and therefore most waterside flowers are pinkish, purplish, or white"; and that "the marshy water-avens has exactly the same dusky purplish yellow tint as the marshy Comarum." We cannot accept this description of the colour of *Comarum*, which, moreover, no one who is not colour-blind could consider the same as that of *Geum rivale*; while *Caltha* and *Barbarea* in spring, *Brassica campestris* and *Lysimachia vulgaris* in summer, and *Senecio aquaticus* in autumn seem to us conspicuous examples of yellow waterside flowers, not to mention such aquatics as *Nuphar* and *Limnanthemum*. Nor can we accept Mr. Allen's statement as to plant-distribution. It is not the case that *Rubia peregrina* "belongs only to a few headlands of Pembrokeshire, the Damnonian peninsula, and the south-west of Ireland"; it is merely an assumption that *Centaurea Isnardi* and *Linaria Pelisseriana* "have *died out* everywhere save in the Channel Islands"; and *Cypripedium Calceolus* is not strictly confined to "one Yorkshire station."

The same author contributes a volume entitled 'Biographies of Working Men' to the series entitled "the People's Library," issued by the Society for Promoting Christian Knowledge. Avowedly a compilation, it is a most readable little volume: Thomas Edward is selected as the example of a working-man naturalist.

Prof. Bentley has issued 'The Students' Guide to Systematic Botany' (J. & A. Churchill) as a companion to the 'Guide to Structural Botany,' which we noticed last year (p. 318). It is a handy little pocket-volume, which cannot fail to be of service to those for whom it is intended.

The indispensable Index to the equally indispensable 'Conspectus Floræ Europææ' has just been issued. It is styled 'Supplementum I.,' and Prof. Nyman bids us look forward to a second Supplement, which will contain matter more in accordance with the generally accepted meaning of the term. The present part contains the Vascular Cryptogams, to which the *Characeæ* are appended, as well as the index to the work, which latter occupies more than 160 pages! Copies may be obtained from the author (Stockholm) for 3*s*. 6*d*., post-free.

Mr. William Hodgson sends us an interesting paper on 'The Botany of the Caldew Valley,' reprinted from No. viii. of the 'Transactions of the Cumberland Association.'

The Kew Report for 1882 and that of the Botanical Exchange Club for the same year were issued in April: we hope to give extracts from each in an early number.

Mr. R. D. Fitzgerald has issued the first part of vol. ii. of his 'Australian Orchids.' It contains figures, executed with his usual care and accompanied by dissections, of species of *Caladenia*, *Sarcochilus*, *Drakæa*, *Dendrobium*, *Prasophyllum*, *Bolbophyllum*, *Microtis*, and *Thelymitra*.

The lately issued (5th) volume of the 'Proceedings of the Dorset Field Club' contains a list of the mosses of Glanvilles Wootton, by C. W. Dale, with some others found in the county by the late Rev. H. H. Wood, of whom a photograph and memoir are prefixed to the volume.

The first part of a new 'Official Guide to the Museum of Economic Botany' at Kew (pp. 152) has recently been published. It deals with the Dicotyledons and Gymnosperms, and is an admirable compilation, the extent of the information given in so limited a space being a remarkable example of condensation. There is also an excellent index, and the cost is but threepence. We would recommend it even to those who are unable to use it as a guide to the Museum as a storehouse of trustworthy information on Economic Botany.

New Books. — C. Salomon, 'Deutschlands winterharte Bäume und Sträucher' (Leipzig, Voigt: 8vo, pp. 233). — G. Caums, 'Guide Pratique de Botanique rurale' (Paris, Lechevalier: 8vo, pp. 180; tt. 52). — J. A. Guillard, 'Flore de Bordeaux et du Sud-ouest' (Paris, Masson: 8vo, pp. cvii. 217). — J. Vallot, 'Essai sur la Flore du Pavé de Paris' (Paris, Lechevalier: 12mo, pp. 123). — F. Hildebrand, 'Die Lebens verhältnisse der Oxalisarten' (Jena, Fischer: 4to, pp. 140, tt. 5). — J. E. Taylor, 'The Sagacity and Morality of Plants' (London, Chatto & Windus: 8vo, pp. 311). — G. Heuzé, 'Les Paturages, les prairies naturelles, et les Herbages' (Paris, 26, Rue Jacob: 8vo, pp. xvi. 256, 3*fr*. 50*c*.). — H. Baillon, 'Traité de Botanique Médicale' (Paris, Hachette: 8vo, pp. 1500). — L. M. Gautier, 'Les Champignons' (Paris, Baillière: 8vo, pp. xii. 508, tt. 16).

Articles in Journals.

American Naturalist. — J. M. Anders, 'Exhalation of Ozone by flowering plants.'

Botanical Gazette. — C. S. Sargent, 'Botanical Papers of G. Engelmann.' — C. R. Barnes, 'Occurrence of Cork between the annual layers in the stem of *Catalpa speciosa*' (1 plate). — G. Vasey, 'A new *Aristida*' (*A. basiramea* Engelm. MS.).

Bot. Centralblatt (No. 18). — H. Schinz, 'Anatomisch-physiologische Untersuchung gerösteter Maiskörner.' — (No. 19). V. v. Borbás, 'Balanographiche Kleinigkeiten.' — (Nos. 20, 21). P. A. Saccardo, 'Conspectus generum Discomycetum hucusque cognitorum.'

Botanische Zeitung (Apr. 25). — H. Hoffmann, 'Culturversuche über Variation.' — A. Blytt, 'Erwiderung.' — (May 2). O. Loew, 'Ueber den mikrochemischen Nachweis von Eiweiss stoffen.' — (May 9). H. de Vries, 'Zur plasmolytischen Methodik.'

Botaniska Notiser (Haft. 3). — S. Murbeck, 'Tvenne för Skandinavien nya Epilobium-hybrider' (*Epilobium palustre* × *parviflorum* and *E. parviflorum* × *tetragonum*).

Bull. Bot. Soc. France (xxx.; Session extraordinaire à Antibes). — M. J. Chareyre, 'La Formation des Cystolithes.' — X. Gillot, 'Quelques plantes nouvelles pour la Flore de France.' — J. Vallot, '*Asplenium septentrionale* sur le quartzite compacte de Lodène.' — H. Vilmorin, 'La Villa Thuret.' — J. E. Planchon, 'Correspondance de J. Gay avec P. Salzmann.' — Id., 'Deux lettres de V. Jacquemont.' — C. Naudin, 'Notice sur les *Eucalyptus*.' — A. Pons, 'Les Anémones de Grasse.' — M. Cornu, 'Deux Uredinées' (*Chromophyton? Woronini*, sp. n.). — (xxxi.; Comptes Rendus 2). P. Van Tieghem, 'Sur une manière de dénominer les diverses directions de courbure des ovules.' — G. Rouy, 'Excursions botaniques en Espagne' (*Microlonchus spinulosus* and *Astragalus gypsophilus*, spp. nn., names only). — E. Bornet & C. Flahault, 'Sur la détermination des rivulaires qui forment les fleurs d'eau.' — P. Van Tieghem, 'Sur les feuilles assimilatrices et l'inflorescence des *Danae*, *Ruscus*, et *Semele*.' — H. Loret, '*Papaver Roubiaei* Vig.' — A. Malbranche, 'Etude Monographique du genre *Graphis*.' — L. Morot, 'Anatomie des Basellacées.' — —. Vuillemin & P. Van Tieghem, 'La situation de l'appareil sécréteur des Composées.' — G. Bonnier & L. Mangin, 'Les Échanges gazeux entre les Lichens et l'atmosphere.' — A. Leblois, 'Le role du latex dans les Composées.' — G. Rouy, 'Additions à la Flore de France.'

Bulletin of Torrey Bot. Club. — G. Vasey, *Catechstechum erectum* Vasey & Hackel (1 pl.). — George Engelmann (portrait). — J. B. Ellis & B. M. Everhart, 'New N. American Fungi' (*Peziza fumigata*, *Schizoxylon monoliferum*, *Leptosphæria Physalidis*, *Sphæria muricata*, *Anthostomella ostiolata*, *Sphæria aquatica*, spp. nn.).

Flora (Apr. 1). — K. B. J. Forssell, 'Lichenologische Untersuchungen.' — (Apr. 11). A. Winkler, 'Die Keimpflanze des *Isopyrum*

thalictroides' (1 pl.). — P. Schulz, 'Anatomische Studien über das anomale Dickenwachstum von *Bignonia æquinoctialis*.' — P. Blenk, 'Ueber die durchsichtigen Punkte in den Blattern.' — (Apr. 21). W. Nylander, 'Lichenes novi e Freto Behringil.' — (May 1). F. Arnold, 'Die Lichenen des fränkischen Jura.' — (May 11). G. Winter, 'Exotische Pilze' (1 pl.). — J. Müller, 'Lichenologische Beiträge.'

Garden (May 3). — T. Moore & P. Barr, 'Nomenclature of *Narcissi*.' — (May 10). *Cypripedium Godefroyæ* (ic. xylog.).

Gardeners' Chronicle (May 3). — *Nepenthes cincta* Mast., *Primula dolomitis* Hort. Llewelyn [Baker], *Masdevallia anchorifera* Rchb. f., spp. nn. — M. T. Masters, *Pseudolarix Kæmpferi* (figs. 112, 113).— *Odontoglossum luteo-purpureum* (figs. 114, 115). — J. L. Jensen, 'The Potato Disease.'— (May 10). *Dendrobium cruentum* Rchb. f., n. sp., *D. purpureum* Roxb. var. (vel. n. sp.) *Moseleyi* Hemsl., *Olearia macrodonta* Baker, n. sp. — *Exacum affine* (fig. 116). — T. Moore & P. Barr, 'Nomenclature of *Narcissi*.'—J. L. Jensen, 'The Potato Disease' (concl.). — (May 17). *Masdevallia flaveola* Rchb. f., *Dendrobium dactyliferum* Rchb. f., spp. nn.—*Odontoglossum Wilckeanum* (fig. 122). — (May 24). J. G. Baker, *Lachenalia fistulosa*, *L. lilacina*, *L. odoratissima*, spp. nn.

Journal of Linnean Society (No. 130, Apr. 26). — J. S. Gardner, '*Alnus Richardsoni*, a fossil fruit from the London Clay of Herne Bay' (1 pl.). — G. Lister, 'Origin of the Placentæ in *Alsineæ*' (4 pl.). — A. W. Bennett, 'Reproduction of *Zygnemaceæ*.' — F. O. Bower, 'Structure of Stem of *Rhynchopetalum montanum*' (3 pl.).— M. C. Potter, 'Development of Starch-grains in Laticiferous Cells of *Euphorbiaceæ*.' — J. R. Green, 'Organs of Secretion in *Hypericaceæ*' (2 pl.). — (No. 131, Apr. 28). F. O. Bower, 'On the Gemmæ of *Aulacomnion palustre*.' — H. Bolus, 'Contributions to S. African Botany (*Orchideæ*)' (*Cymbidium ustulatum*, *Bartholina Ethelæ*, *Satyrium saxicolum*, *S. Lindleyanum*, *S. Hallackii*, *S. marginatum*, *Disa ocellata*, *D. purpurascens*, *D. venusta*, *D. lugens*, *Brachycorythis Tysoni*, *Disperis namaquensis*, spp. nn.). — J. G. Baker, 'Tuber-bearing species of *Solanum*' (*S. Andreanum*, n. sp.; 5 pl.). — M. C. Cooke, 'Structure and Affinity of *Sphæria pocula*' (1 pl.). — C. B. Plowright, 'Life-history of *Æcidium bellidis*.' — F. Kitton, 'Diatomaceæ from Socotra' (*Cerataulus socotrensis*, n. sp.) —(Nos. 132–133). C. B. Clarke, 'Indian Species of *Cyperus*' (*C. sulcinux*, *C. leucolepis* (Carey MS.), *C. argentinus*, *C. Atkinsoni*, *C. Kurzii*, *C. turgidulus*, *C. pedunculosus* (F. Muell. MS.), *C. benghalensis*, *C. gracilinux*, *C. biglumis*, spp. nn.; 4 plates).

Magyar Növênytani Lapok (April). — J. Schaarschmidt, 'On *Zygnemaceæ*.'

Midland Naturalist.—W. Hillhouse, 'The Intercellular Relations of Protoplasts' (1 pl.). — W. B. Grove, 'On the *Pilobolidæ*.'

Nature (May 1). — F. Darwin, 'The Absorption of Water by Plants.'—(May 22). H. M. Ward, 'The Potétomètre, for measuring the transpiration of water by plants.' — H. N. Moseley, '*Utricularia vulgaris* preying on fish.'

Oesterr. Bot. Zeitschrift. — A. Gehmacher, 'Ueber den anatomischen Bau einiger sogenannter Korkhölzer.' — K. Polák, '*Hieracium crepidiflorum*, sp. n.' — E. Formánek, 'Flora der Beskiden.' — K. Untchj, 'Flora von Fiume.' — J. B. Wiesbaur, 'Bosniche Rosen.' — P. G. Strobl, 'Flora des Etna' (contd.).

Pharmaceutical Journal (May 3). — A. W. Bennett, *Beggiatoa alba*, the "Sewage fungus." — (May 10). W. Kirkby, 'Note on Kamala.' — (May 17). W. T. T. Dyer, 'Waras.'

Science-Gossip.—W. Roberts, Root action of *Convallaria majalis*.

Science Monthly. — G. C. Chisholm, 'Lessons from common Plants.'

Trans. Bot. Soc. Edinburgh (xv., pt. 1).—R. Spruce, 'Hepaticæ Amazonicæ et Andinæ,' pt. 1 (4 plates).

Trans. Linn. Soc. London (2nd S., ii., pt. 7). — H. N. Ridley, 'The *Cyperaceæ* of the West Coast of Africa in the Welwitsch Herbarium' (*Acriulus*, gen. nov.; 2 plates).

LINNEAN SOCIETY OF LONDON.

February 21, 1884.—Sir John Lubbock, Bart., President, in the chair.—Mr. Alfred Prentice Young, of Bombay, and Mr. D. Sullivan, of Victoria, were elected Fellows of the Society. — Mr. R. Miller Christy showed a collection of dried plants obtained by him in Manitoba during last summer. — Mr. W. T. T. Dyer exhibited and made remarks on portions of wreaths from the coffin of the Princess Uzi Khomso, of the XXI. Egyptian Dynasty.* — A paper was read by Mr. H. N. Ridley, "On the *Cyperaceæ* of the West Coast of Africa in the Welwitsch Herbarium." The author mentions that in the collections there are 159 species of cyperaceous plants, of which fifty-seven were not previously described. They belong to sixteen genera, eleven of which are cosmopolitan, two S. American, and two endemic. Of the species more than one-half are exclusively African, and one-ninth occur also in S. America, but not in Asia. These latter are forest-loving plants, which seems to negative the idea of their having been drifted across from America by ocean-currents. Comparing the proportion of the higher plants common to both the continents only, we find it much smaller, *viz.*, 1-59th. Of the highest animals, according to Wallace, few genera even are common to both continents, but the insects of both are closely allied. This seems to denote the great antiquity of the connection of the two lands, which is confirmed by an account resulting from the studies of the maritime fauna of both coasts; from which it is clear that the proportion of echinoderms common to both regions far exceeds that of the later-developed fish and molluscs. — Mr. R. Miller Christy read a paper entitled "The power of penetrating

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* See Journ. Bot. 1882, p. 317.

the skins of animals possessed by the seed of *Stipa spartea*." This species is very abundant on all parts of the dry portions of the prairies of the Canadian North-West, and ranges southward quite into Texas and Mexico, having a range of distribution coextensive with that which the buffalo formerly had. It is the most valuable of all the prairie grasses; its leaves are preferred by buffaloes and all domestic animals to any other—hence its common name of "buffalo grass." These seeds ripen during the latter half of July, when they are very troublesome to both man and beast. The seed has a point as sharp as that of a needle, with barb-like hairs to prevent its coming out of any substance it has once penetrated. It is also provided with an awn some three inches in length, which possesses the power of hydroscopic movement, being twisted up when dry and untwisting when wetted. Each revolution occupies about ten minutes, and the turns are usually eight or nine in number. Above this portion is a straight, stiff, untwisted arm, some two inches long, set at right angles when dry, but in the same axis as the twisted portion when wet; having a number of very minute teeth, it offers resistance to the grass or wool of animals, which, in the straightening of the awn after being wetted, have the effect of pressing the point against and into the ground. Experiments were detailed showing that the seeds have the power of penetrating both the ground and the skins of animals; and inquiry among butchers and others showed conclusively that large numbers were often found beneath the skin of sheep, especially about the shoulders. Woolly-haired dogs are also troubled. No evidence, however, was obtainable to give truth to the statement commonly made, that the seeds have the power of killing the animals directly, though probably death would ensue were ulceration allowed to proceed far enough. Mr. Christy suggested that the mechanism of the seed and awn was a contrivance for ensuring dispersal by means of the buffalo, but objection was raised to this on the ground that it was more probably a contrivance for penetrating the ground. In all general points of structure and movement the awns of *S. spartea* are very similar to those of *S. pennata*, as described by Dr. G. H. Darwin.—Mr. John Ball gave the gist of his "Contribution to the Flora of North Patagonia and the adjoining Territory," the material for which has been chiefly derived from collections made by M. Georges Claraz (who has furnished notes respecting the species, their properties, uses, and vernacular names), along with other collections at the Kew Harbarium. Mr. Ball enters into the physical geography of the districts: he does not agree with Prof. Lorentz that the uniformity and sterility of the soil and of the climate explain the poverty of the flora; but he is inclined to Mr. Charles Darwin's view that the absence of true vegetation from the pampas is due to the area having been (relatively speaking) only recently raised from the sea, while the adjoining S. American area could not supply species suited to soil and climate. Mr. Ball remarks, among the notable features of N. Patagonian as compared with the Argentine flora, the much larger proportion of *Rosaceæ* and *Gramineæ* in the former region; and a complete absence of *Malva-*

ceæ, *Convolvulaceæ*, and *Euphorbiaceæ*, of which orders the Argentine flora contains 171 species, or more than 7½ per cent. Mr. Ball dissents from the paucity, alleged by Grisebach, of subtropical forms in the Valley of the Uraguay, stating that the majority of the bushes are characteristic of Temperate S. America, and the herbaceous vegetation of equal proportions of subtropical and S. American temperate floras.

March 6.—Sir John Lubbock, Bart., President, in the chair.—Dr. Aug. Burke Shepherd and Mr. James Dallas were elected Fellows, and Mr. William Hodgson, of Cumberland, an Associate of the Society.—Mr. J. Britten exhibited specimens of *Lithospermum purpureo-cæruleum*, illustrating the life-history of the plant as cently described by Mr. J. W. White in the 'Journal of Botany' (p. 74). — Mr. F. O. Bower drew attention to a figure published in the 'Gardeners' Chronicle' for March 1, representing a case of proliferation of the so-called double needle of *Sciadopitys verticillata*. He alluded to the various views which have been put forward as to the morphological value of the "double needle," and concluded that the one first propounded by Prof. Alex. Dickson, and afterwards discussed by Von Mohl in an adverse sense, and by Goebel favourably, is most in accordance with the history of its development. He pointed out that the figure in question represents a monstrous form, which bears out this view. The lower part of the phylloclade is here developed in the normal manner; about one-third from the base a leaf is given off similar to the needle of *Pinus*, and without any emargination of the apex; higher up a second similar leaf is given off from the opposite side, while the axis continues its growth, and forms organs in a similar manner to any main axis of the plant. Such proliferations were obtained by M. Carrière from the apices of cones which had been grown through, and the explanation probably is that the axillary axes at that point are provided during their development with an excessive supply of nutritive material. This brings about a stronger development of the apex of the axillary shoot, which is under normal circumstances almost, if not entirely, arrested. If the double needle be regarded as a phylloclade with arrested apical growth, this case of proliferation may be readily explained as an example of continued apical growth, accompanied by a displacement of the normally more intense intercalary growth. In the normal condition this growth is strongly localised below the apex of the axillary shoot. In the abnormal example in question growth has been distributed not only at that point, but also in the leaves themselves and also in the apex of the shoot, with the additional organs which it bears. —Dr. Maxwell Masters showed and made remarks on what might be termed a normal example of bud-variation in *Pinus sylvestris*; but whether caused by a fungus or insect it was difficult to say, as these variations were not observed at their early stages. — Mr. Alfred W. Bennett drew attention to specimens under the microscope of species of *Ptilota* and *Callithamnion*, which demonstrated the continuity of the protoplasm.—The Secretary read an abstract of an important contribution by Mr. C. B. Clarke, "On the Indian

Species of *Cyperus*, with remarks on some others that specially illustrate the subdivisions of the genus." The author divides his memoir into three sections:—1, a descriptive account of each part of a *Cyperus*, viz., the culm, inflorescence, &c., comparing these successively in all the Indian species; 2, a discussion of some difficult species and disputed genera; 3, a systematic arrangement with descriptions of the Indian species, with short citations of some non-Indian species that more particularly illustrate the subdivisions and groups. — Then followed a paper, "Notes on Afghanistan Algæ," by Dr. Jules Schaarschmidt, founded on material derived from Surgeon-Major Aitchison's collection of plants made during the Afghanistan Expedition in 1880.

March 20.—H. T. Stainton, F.R.S., Vice-President, in the chair. — The Rev. Canon Jas. Baker, Mr. Wm. Brockbank, Mr. Robt. Mason, and Mr. Edwd. A. Heath were elected Fellows of the Society.—Mr. J. G. Baker showed and made remarks on a supposed hybrid between the Oxlip (*Primula elatior*) and the Cowslip (*P. veris*). —A paper, accompanied by many drawings, "On the Hairs occurring on the Stamens of Plants," by Mr. Greenwood Pim, was read by the Secretary. The author observes that, while the leaves and stems have had a due meed of attention paid to their hairs, the staminal ones, on the contrary, have not been so closely examined, though their variations are numerous. As to their morphology, he sums up the groups thus:—(1) Simple unicellular subulate smooth hairs; *Malva*, *Campanula*: (2) unicellular, subulate, rugose or papillar; *Cuphea*, *Nerium*, *Eutoca*: (3) unicellular, flattened spathulate, rugose or striate; *Verbascum*, *Celsia*, *Antirrhinum*: (4) pluricellular, simple, smooth; *Salvia*, *Adhatoda*: (5) pluricellular, simple, rugose or striate; *Anagallis*, *Goldfussia*, *Thunbergia*: (6) pluricellular and branched; *Browallia*, and some forms of *Salvia*: (7) pluricellular, with glandular tip; *Oxalis*, *Æschynanthus*, *Gesnera*: (8) multicellular; *Convolvulus*, *Ipomæa*, *Lasiandra*.—A paper was read, "On the Life-History of *Æcidium bellidis*," by Mr. Chas. B. Plowright, and in which he gives the results of a series of experiments, noting the date of infection and appearance of the uredo. He differs in opinion from most of the British and continental authorities who regard the *Æcidium* of the Daisy as a variety of *Æ. compositarum*, while he himself demonstrates it to be a true heterocismal uredine. — A communication was read by Mr. F. Kitton, "On some *Diatomaceæ* from the Island of Socotra," in which a number of new species are described and figured.

April 3.—Sir John Lubbock, Bart., President, in the chair.— Mr. Wm. Brockbank exhibited a series of double daffodils, wild forms of *Narcissus Pseudo-narcissus*, which were gathered in a Welsh meadow from among many of both the single and double forms occurring there in every stage of growth.—Mr. C. F. White read a short note on pollen from Mummy Garlands. Some of the dried charred-like anthers and pollen of *Papaver Rhœas* were subjected to microscopical investigation, showing that the pollen-grains freely absorbed water, became swollen, and in other respects were barely to be differentiated from the pollen-grains of the recent Poppy.

ON THE BRITISH DAFFODILS.

By J. G. Baker, F.R.S.

(Plate 247).

I took advantage of the opportunity of the great Daffodil Show at South Kensington, held on the 1st of April under the auspices of the Royal Horticultural Society, to ask the experts what they knew about two forms which have been supposed to be British, which have been individualised by gardeners for a couple of generations, but almost altogether neglected by botanists. I mean the *Ajax cambricus* and the *Ajax lobularis* of Haworth. These were described by him in his well-known Monograph of the *Narcissineæ* which appeared as a supplement to the fourth volume of Sweet's 'British Flower Garden' in 1838. The following is what Haworth says about the four British forms:—

"... Group *Lutei*, floribus plerumque luteis, sæpe sulphureis, rarissime stramineo-albicantibus, corona plus minusve sæpe saturatiore.

"Sub-group †*Serricoronæ*, statura mediocri, *corona* minus profunde serrata seu crenata quam in sequentibus.

"13. *Pseudo-narcissus* A. (the garland), scapo ancipiti teretiusculo recto striato; corollæ laciniis pallide sulphureis, exterioribus lanceolato-ellipticis tubum vix superantibus; corona lutea ore recto crenatim serrato longitudine laciniarum. Linn. sp. 1, p. 414.

"*Ajax festalis*, Salisb. in Hort. Tr. v. 243. *Narcissus Pseudo-narcissus*, Eng. Bot. t. 17.

"Sub-group ††*Lobato-coronæ*, mediocres, lobis integrioribus.

"16. *lobularis* A. (Tenby 6-lobed Daffodil), corollæ laciniis luteis tubo obconico exacte duplo longioribus; corona perlutea patula sexlobata (lobis integris) laciniis tres lineas superante. Nob. in Phil. Mag. May, 1830, p. 131.

"This grows wild near Tenby, in Pembrokeshire, which by mistake was written Truby, in Derbyshire, in the place above cited.

"β. ? *amplicorona*.

"Obs. — In Chelsea Garden a wild bulb from Devonshire, with double flowers, produced offsets bearing for the three last years permanently *single* ones. Was its source genuine? It would form a good species with the following essential characters:—

"*Corollæ* laciniis ovato-acutis valde imbricantibus luteis, tubo sesquilongiore; corona amplissima perlutea, basi ad apicem perdilatata sub-20 lineas expansa crenatim incisa subplicata crispula, intus rugosiuscula, laciniias superante.

"γ. *plenus* (the common deep yellow double Daffodil).

"δ. *scotica*. Scapo compresso ancipite torto alte striato, corollæ laciniis lanceolato-ellipticis sulphureis tubum longe superantibus, corona lutea, ore magno expanso insciso crenato ruguloso. Forte propria species. Exemplariam unum solum examinavi.

"18. *cambricus* A. (the recurving-lobed), corollæ laciniis luteis

ovato-acuminatis tubo tertio parte longioribus, corona perlutea alte sexlobata, lobis patulis vix rugosiusculis plicato-crenatis recurvantibus.

"Communicavit amicus Dom. Penny, fine Martii, 1831.

"Habitat in Cambria. Nova species, vel fortasse precedentis [rugilobus] varietas. Florem unum marcescentem solum vidi.

"Sub-group †††*Incisilobæ*. Majores et maximi, *coronæ* lobis profundis propriis sex, semper plus minus irregulariter laciniato-serratis, seu crenatis.

"24. *Major* A. (the great), corollæ perluteæ laciniis patulis, corona patentissima amplissima, lobis omnium maximis recurvis subundato crenatis; foliis glaucissimis spicalibus."

All these four were abundantly represented at the show, and the following were the notes I made upon the specimens which I begged from the exhibitors, particularly Mr. Dillwyn Llewelyn and Mr. Barr, to take home:—

1. *Pseudo-narcissus*. — Peduncles much more slender than in *major*, about a foot long. Tube of perianth $\frac{5}{8}$ in. long, half an inch in diameter at the throat. Segments pale sulphur-yellow, $1\frac{1}{4}$ in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. broad. Corona lemon-yellow, rather paler than in *major*, $1\frac{1}{4}$ in. long; edge spreading, not distinctly 6-lobed, but plicate and irregularly crenate-dentate. Flowering, according to Mr. Barr, with *lobularis*, later than *cambricus*, earlier than *major*.

2. *lobularis*. — Dwarfest of the four. Tube of the perianth $\frac{1}{2}$–$\frac{5}{8}$ in. long, and the same diameter at the throat; segments lemon-yellow, spreading, $\frac{7}{8}$–1 in. long, $\frac{1}{2}$ in. broad. Corona orange-yellow, just exceeding the segments in length, deeply 6-lobed; lobes erect, $\frac{1}{3}$ in. deep, $\frac{1}{3}$–$\frac{1}{2}$ in, broad, their margin crisped, and minutely crenate.

3. *cambricus*. — Peduncle about equally robust as in *pseudo-narcissus*. Perianth with a tube $\frac{3}{4}$ in. long, $\frac{3}{4}$ in. diameter at the throat, not so green as in *major* and *pseudo-narcissus*; segments oblong, lemon-yellow, $1\frac{1}{4}$ in. long, $\frac{3}{4}$ in. broad. Corona $1\frac{1}{4}$ in. long, orange-yellow, $1\frac{1}{4}$ in. diameter at the throat; edge rather spreading, 6-lobed, but not so deeply as in *lobularis*; the lobes crenate, crisped, and slightly imbricated.

4. *major*. — Taller and more robust than the others; peduncle often $1\frac{1}{2}$–2 ft. long. Perianth with a tube $\frac{3}{4}$ in. long; segments oblong, lemon-yellow, $1\frac{1}{4}$ in. long, $\frac{3}{4}$ in. broad. Corona orange-yellow, $1\frac{1}{2}$ in. long, much less distinctly 6-lobed than in *lobularis*, the margin crisped and copiously inciso-crenate. It flowers the latest of the four.

Pseudo-narcissus is evidently the daffodil truly wild in Britain, which occurs so plentifully at the lakes and elsewhere. *Major* is the common great daffodil of the gardens, often double, and occurring commonly as a garden escape. I cannot myself distinguish *cambricus* clearly from *lobularis*, or either of the two from *obrallaris*. Mr. Brockbank tells me that *lobularis* at the present day is plentiful as a wild plant in South Wales, extending over an area of twenty miles from Tenby westward across country to

Haverfordwest and St. Bride's Bay, but that it is regarded by the country people as an introduction brought in either by the "Flemings" or the "Spanish Armada." But if it be introduced in Wales, its native home still remains to be found, for, as far as I know, neither *obvallaris*, *cambricus*, or *lobularis* are known on the Continent. I expect the *N. pseudo-narcissus* var. *Bromfieldii* of Syme is essentially the same thing. In Mr. Barr's catalogue I see the bulbs of *lobularis*, *pseudo-narcissus*, and *major* are quoted at threepence each, and of *cambricus* at sixpence; so that any of your readers who want to grow the four for himself side by side can do so for an outlay of fifteenpence and postage.

PLATE 247.—Fig. 1. *Narcissus major*. 2. *N. lobularis* (side and front view). 3. *N. pseudo-narcissus*.

NEW OR NOTEWORTHY FUNGI.

By W. B. GROVE, B.A.

(Concluded from p. 136.)

16. *Hypomyces Baryanus* Tul. Ann. Sc. Nat. ser. iv. xiii. 13 (1860); Sel. Fung. Carp. iii. 59 (1865); Saccardo, Mich. i. 286 (1878); Cooke, Grev. xii. 108 (1884).

Parasitic within the gills (and more sparingly within the stem and pileus) of *Nyctalis parasitica*. Macroconidia only known, solitary, acrogenous or mesogenous, oblong-oval, smooth, brownish, paler at each extremity, 16–20 $\mu \times 10\ \mu$.

On *Nyctalis*, which occurred on *Russula adusta*, Solihull; New Park, Middleton (Wk.), September, October. This fungus is almost entirely internal in its growth; every part of the gills is seen, in section, to be crowded with the macroconidia, which were extremely abundant, and caused the gills to be wonderfully thickened and contorted. In a more advanced stage, the stem and pileus beneath the whitish villous coat are similarly affected. The *Nyctalis* never bears at the same time this parasite and *H. asterophorus*, although, according to Tulasne, of a group of *Nyctalis* growing upon a *Russula* some may be affected with the one and others with the other parasite. The ordinary description of the gills of *N. parasitica* is founded upon affected specimens; the normal gills are uncontorted.

17. *Ascobolus minutissimus* Boud. See Midl. Nat. vi. 164, for description.—On cow dung, Water Orton (Wk.); Harborne (Ws.), September, October. (Tab. 246, f. 11).

**Perichæna depressa* Lib.; Cooke, Myxom. p. 77. — On dead wood, Sutton (Wk.), October. Remarkable for its flatly-convex lid with an elevated margin, like that of a raised pie.

**Septoria dianthi* Desm.; Mich. i. 187. — This is mentioned by name (Grev. v. 70) as British, but not described. The following description is drawn up from my specimens:—

Spots roundish or oval, about 1-5th inch diam., ochraceous, with a broad purple border; perithecia epiphyllous, numerous, minute, round, black, with the cuticle forming a raised white spot

in the centre of each, at length broadly perforate; spermatia slender, cylindrical, flexuous, hyaline, continuous, 35–40 $\mu \times 3{\cdot}5\ \mu$.

On leaves of *Dianthus barbatus*, Rednal (Ws.), September.

CYLINDRIUM (Bonorden) Sacc.

Spores simple, elongate-cylindrical, concatenate, obtuse at each end, hyaline or brightly coloured. Mich. ii. 14 (1880).

The diagnosis of the genus *Cylindrium*, given in the 'Handbook,' p. 608, is mis-transcribed from Bonorden, who defines the spores as simple, and, in speaking of the species which he calls *C. septatum*, says that, if he "had had the good fortune to discover more species" with septate spores, he "should not hesitate to found a new genus, *Septocylindrium*, for them." This has since been done, and it is worth notice how Bonorden's acute prophecy that "there will certainly be found species with septate coloured spores" has been verified by the discovery of *Septocylindrium virens* and *S. dissiliens*. Bonorden's *Cylindrium* was, however, slightly different from Saccardo's. — *Cylindrium septatum* Bon. will now stand as *Septocylindrium Bonordenii* Sacc.

18. Cylindrium Cordæ mihi (*nec* Sacc.).—*Fusidium cylindricum* Corda, Icon. i. 3, pl. 1, fig. 52 (1837); *non* Fuckel, Symb. 371, *nec aliorum*.

Tufts minute, white, confluent in small roundish patches; chains of spores short, erect, frequently branched; spores cylindrical, truncate at each end, colourless, 20–22 $\mu \times 2\ \mu$. (Tab. 246, f. 2).

On dead oak-leaves, The Rookery, Edgbaston Park (Wk.), October. The spores differ in the proportion of length to breadth from those of Corda's species, which was also on dead oak-leaves, but are undoubtedly identical. Saccardo's *C. Cordæ* is a species of *Ramularia* (*R. Lampsanæ*, Fung. Ital. fig. 995; see Mich. ii. 549) which is found on living, but faded leaves of *Lapsana communis*. The same habitat given by Fuckel (*l. c.*), which is also that of the *Fusidium cylindricum* recorded as British (Grev. iv. 120), shows that these must be referred to the *Ramularia*. It should be noted that all figures of *Fusidium* or *Cylindrium* like Corda's (*l. c.*); which show the spores loosely heaped on the surface of the leaf, do not represent the growing state, which is as I have drawn it, but as it looks when beaten down by the weather.

PARASPORA, gen. nov.‡

Mucedinea, micronemea, saprophila. Sporæ septatæ, mycelio tenui repenti insidentes, fasciculatæ.

19. †**Paraspora triseptata**, sp. n. — P. alba, sporis oblongis, basi oblique apiculatis, hyalinis, triseptatis. (Tab. 246, f. 9).

On dead wood, Sutton (Wk.), November. There is no genus known to me in which this could be placed. It resembles *Bactridium*, but hyphæ are almost entirely wanting. Spores 15–18 $\mu \times$ 5–6 μ. Invisible to the naked eye.

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‡ παρά, side by side; σπορά, a spore.

**Helicomyces roseus* Link; Cooke, Grevillea, ii. 139 (1874); Saccardo, Mich. ii. 287; Fung. Ital. fig. 813 (1881).

Occurring in thin wide-spreading rosy (or rosy violet) patches. Hyphæ present, but very short, bearing near the apex one or two long, slender, multinucleate, at length multiseptate, rosy spores, which taper at each end.

On the inside of dead bark, Sutton (Wk.), February. Spores 150–200 $\mu \times 4{\cdot}5$ μ, at first closely coiled in a flat spiral, 30 μ in diameter, of about three turns, singly colourless.

20. *Ovularia sphæroidea* Sacc. Fung. Ital. fig. 979 (1881).—*Ramularia sphæroidea* Sacc. Mich. i. 130 (1878).

"Tufts between erumpent and superficial, white, velvety, hypophyllous; hyphæ fasciculate, filiform, 40–50 $\mu \times 3$ μ, tortuose, remotely denticulate above, hyaline; spores arising from the teeth, globular, 8–9 μ in diameter, more rarely 8 $\mu \times 7$ μ, at the base shortly and obsoletely apiculate, hyaline."—Sacc. Mich. *l. c.* (Tab. 246, f. 1).

On the lower surface of living leaves of *Lotus corniculatus*, Solihull and Berkswell (Wk.), August. Forming small roundish patches, surrounded by a narrow brown border. Hitherto only found near Berlin, 1869 and 1875. *Ovularia* is essentially distinguished from *Ramularia* by its short and non-septate spores.

21. *Botrytis coccotricha* Sacc. Mich. i. 270 (1878); Fung. Ital. fig. 694 (1881).

Tufts densely crowded in diffused dirty ferruginous patches. Hyphæ more or less dichotomously branched, tufted, 200–400 $\mu \times$ 6–7 μ, hyaline, here and there swollen; spores usually solitary at the tapering apices of the branches, ovoid or roundish, 25–30 $\mu \times$ 16–18 μ, perfectly smooth, at first granular, ferruginous brown. (Tab. 246. f. 5).

On oak-chips, Crackley Wood, Kenilworth (Wk.), July. My specimens were beaten down by the weather, but are doubtless identical with Saccardo's species. *Coccotrichum dichotomum* Preuss (Sturm, vi. 75, pl. 38 [1851]), which Saccardo quotes (Mich. *l. c.*) as synonymous, is probably different; it has rounder warted capitate spores, and the hyphæ are cylindrical and regularly dichotomous above; in my specimens they were sometimes irregularly dichotomous, as in Saccardo's figure, sometimes with opposite branchlets as in fig. 5, which is chosen to illustrate the extreme.

22. †**Verticillium** (Acrocylindrium) **quaternellum**, sp. n.—V. niveum; mycelio gracillimo, intricate ramuloso; hyphis fertilibus sat brevibus, hyalinis, erectis, fere cylindricis, remote septatis; ramulis verticillatis, quaternis ternisve, rectis, simplicibus, cylindricis, apice sporas 3–5 (frequentissime quaternas) gerentibus; sporis oblongis, hyalinis, 7–8 μ longis. (Tab. 246, f. 7).

On *Mycenæ*, with *Mucor macrocarpus*, Middleton (Wk.), October. Stem about 1-100th inch high. Mycelium forming a thin cottony layer on the pileus and gills. This had the appearance of being a conidiophorous state of the Mucor. It resembles *V. cylindrosporum* Corda (Icon. i. fig. 275), but the spores are much smaller, usually quaternate, and oblong, not cylindrical. *Stachylidium agaricinum*

Fr. Syst. Myc. iii. 392, from the description, appears to be very similar; whether identical or not I cannot say, but, even if so, the name must be changed, as there are already two plants called *Verticillium agaricinum* (Corda, Icon. ii. fig. 68; and Cooke, Grev. i. 184).

ARTHROBOTRYS Corda (1840).‡

Mucedineous. Hyphæ erect, simple, septate, nodulose; nodules warted, bearing clusters of spores. Spores didymous, apiculate at the base. Corda, Flor. Muc. p. 43.

Distinguished from *Gonatobotrys* by its septate spores.

23. *Arthrobotrys oligospora* Fres. Beitr. zur Myk. p. 18, pl. 3, figs. 1–8 (1850); Bonord. Handb. p. 105 (1851); De Bar. & Wor. Beitr. ser. 3, pp. 29–32, pl. 6, figs. 8–23 (1870).

Fertile hyphæ short, erect, hyaline, sparingly septate, simple, bearing at intervals, or often at the top only, swellings covered with little warts, on each of which is an obovate, uniseptate, enucleate spore, with a very short pedicel. Spores 36 μ long (Fres.), 28–34 μ × 19–22 μ (mihi). (Tab. 246, f. 3).

On a tuft of *Sphagnum*, close to a patch of *Sordaria fimeti*, Edgbaston (Wk.), April. Stem about 200–300 μ high.

De Bary found his specimens in company with *S. fimiseda* (*l. c.*, pp. 21–2, 29); mine appeared on *Sphagnum*, under a bell-glass under which I was growing both *S. fimiseda* and *S. fimeti*. If, therefore, it is a conidial stage of one of these, the probability is that it proceeded from the former. Coemans and Saccardo unite this with *A. superba* Corda; but it differs not only in the small number of spores, but also in their much larger size, and, if Corda's drawing (*l. c.* pl. 21) be correct, in their form.

PRISMARIA Preuss (1861).

Mucedineous. Stem erect, simple, continuous. Spores apical, radiating, continuous (?) or indistinctly septate, prismatic (Sturm., vi. 109).

I have slightly altered the generic character, so as to include the species described below.

24. † **Prismaria furcata,** sp. n.—P. sparsa vel gregaria, alba; mycelio tenui, repenti; hyphis fertilibus curtis vel subnullis, æqualibus, hyalinis, continuis, apice duas vel rarius tres sporas oblique radiantes gerentibus; sporis longis, prismaticis, basi rotundatis, sursum sensim attenuatis, hyalinis, inconspicue multiseptatis, multinucleatis, 60–100 μ × 6–7 μ. (Tab. 246, f. 4).

On decaying wood, Sutton (Wk.), November. Preuss (*l. c.*) describes his species, *P. alba*, as having continuous spores, but his drawing (fig. 55) shows indistinct markings across the spores which may represent imperfect septa. The present species is at any rate distinct in the more tapering spores, and the want of the four-cleft stem. If it were certain that Preuss's species had non-septate spores, I should not hesitate to form a new genus, *Prismina*, for the reception of this.

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‡ ἄρθρον, a joint; βότρυς, a bunch of grapes.

DACTYLELLA, gen. nov.‡

Mucedinea, macronemea, saprophila. Hyphæ fertiles erectiusculæ, simplices. Sporæ elongatæ, solitarie acrogenæ, pluriseptatæ.

Allied to *Dactylium*, but differing in the solitary spores.

25. †**Dactylella minuta**, sp. n. — D. sparsa, alba; hyphis fertilibus cylindricis, gracilibus, hyalinis, simplicibus, apice in sporas singulas, clavulatas, perfecte hyalinas, multiseptatas, evadentibus. (Tab. 246, f. 6).

On dead wood, Sutton (Wk.), February. Stem 120–150μ high; spores 60–70 $\mu \times$ 14–15 μ, with 6–8 septa. This species closely resembles *Dactylium candidum* Nees (Bonord. Handb. p. 82, fig. 139), but differs in the form of the spores, if Bonorden's figure be correct, and in their constant position as a continuation of the stem. It is certainly not congeneric with *Dactylaria purpurella* Sacc. (Fung. Ital. fig. 8).

26. *Bispora pusilla* Sacc. Mich. i. 78; Fung. Ital. fig. 21 (1877).

"Effused, black; hyphæ short, filiform, ascending, pallid; conidia arising from the apex, collected into rather long, rarely branched chains, ovoid, rounded at each end, not truncate, 6–8 μ $\times$ 3·5–4·5 μ, in the middle broadly and opaquely 1-septate, not or hardly constricted, dark brown."—Mich. *l. c.*

On hard dry wood, Sutton (Wk.), December 31st. Distinguished from *B. monilioides* by its smaller and not truncate spores.

**Sporodesmium* § *lobatum* B. & Br. 'Handbook,' p. 485. On the outer surface of the scales of fir-cones, Barnt Green (Ws.), March.

STACHYLIDIUM Link (1809).‖

Dematioid. Hyphæ erect, subverticillately branched; spores aggregated on the apices of the branches, globose or ovoid.

This genus, which includes one species, *S. bicolor*, recorded by Berkeley (Eng. Fl. v. 341) from Apethorpe and Margate, seems since to have dropped out of the British flora.

27. †**Stachylidium cyclosporum**, sp. n. — Ramis ramulosis, apices hyalinas acutis; sporis perfecte globosis.

On a rotting stick in a hedge, King's Heath (Ws.), March. I was at first inclined to regard this as a variety of *S. bicolor* (Sacc. Fung. Ital. fig. 50), but the differences seem sufficient for specific rank. Stem erect, tapering slightly, dark brown below, paler above, 200–300 $\mu \times 4$ μ, septate; just below each septum in the upper half 2–4 branches arise, each consisting of 2–4 articulations, and bearing opposite or alternate branchlets; ultimate articulations lanceolate-acute, hyaline, each bearing a cluster of spores 8–10 μ in diam. Spores round, 2–2½ μ diam., involved in a little mucus, nearly colourless. Forming a greyish mealy patch.

**Helminthosporium folliculatum* Corda, var. β. *brevipilum*, Icon.

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‡ Diminutive from *dactylus*, δάκτυλος, a finger.

§ Not *Sporidesmium*, which is erroneously formed.

‖ Diminutive (?) from στάχυς, an ear of corn.

ii. p. 13, fig. 60 (1838); Bucknall, Fung. Brist. Distr. pt. v. p. 5, pl. 2, fig. 5. — *H. foll.* var. *caulicola* Sacc. Mich. ii. 174 (1880).

Hyphæ shorter than in the type, 50–60 μ × 6–8 μ, quite simple, nearly straight. Spores straight, cylindrical, semipellucid, about 12-septate, 50–70 μ × 10–11 μ; septa rather indistinct.

On dead wood, Sutton (Wk.), May. Saccardo's name is inappropriate, as the variety is not confined to herbaceous stems.

**H. rhopaloides* Fresen. Beitr. zur Mykol. p. 50, pl. 6, figs. 15–21 (1852); Vize, 'Plants of Forden'; Cooke, 'Grevillea,' v. 58 (1876); 'Black Moulds,' pl. 24, fig. 3 (1877); exs. ii. 448; Sacc. Mich. i. 538 (1879), ii. 173 (1880); Fung. Ital. fig. 831 (1881).

Hyphæ often trifurcate above, forked, or simple, 120–180 μ × 9–10 μ. Spores somewhat clavate, 10–11-septate, 80–90 μ × 10–12 μ, with an oil-globule in each cell; terminal cells subhyaline.

On nettle-stems, Blackwell (Ws.), March.

28. *H. obclavatum* Sacc. Mich. i. 85 (1877); Fung. Ital. fig. 52 (1877).

Effused, forming large blackish spots. Hyphæ erect, filiform, somewhat thickened below, 6–7 μ broad, as much as 100 μ high, with few septa, dark brown. Spores solitary, apical, fusoid-obclavate, attenuated upwards, rounded and subhyaline at apex, with 12–16 septa, dark brown, 80–100 μ × 20 μ. (Tab. 246, f. 8).

On chips, Sutton (Wk.), September—May.

**H. stemphylioides* Corda, Mucedin. pl. 4, sub *Helmisporio* (1840); Cooke, Blk. Moulds, p. 250, pl. 24, fig. 2 (1877); Stevenson, Myc. Scot. p. 271 (1879).

On chips, Sutton (Wk.), February. Occurring in densely fasciculate, scattered tufts, mixed with *H. obclavatum*. This is not a true *Helminthosporium*, nor is it allied to *Mystrosporium* very closely, but rather to that section of *Sporodesmium* which Cooke has separated ('Grevillea,' xii. 35) under the name of *Bactrodesmium*; in fact, it bears a great resemblance to *S. abruptum* B. & Br., the type of Cooke's genus, except in the longer stem.

29. *Fusisporium cereale*‡ Cooke, Grev. vi. 139 (1878), from Florida.

On culms (stubble) of wheat, Witton (Wk.), September. (Tab. 246, f. 10).

The specimens which I found agree as well as may be with the description, except that the spores are rather more variable in size; the smaller and (?) younger are not constricted.

30. *Epicoccum purpurascens* Ehrenb. Sylv. Myc. Ber. p. 12 (1818); Corda, Weitenweber Beitr. p. 85; Sacc. Mich. ii. 386 (1881). — *E. vulgare* Corda, Icon. i. p. 5, fig. 90, *pro parte* (1837).

"Seated on a purplish spot. Stroma convex, oblong, blood-coloured, then blackish; spores crowded, globose, reticulate, brown; areolæ marked in the middle with a black wart; pedicels attenuated, white, transparent."—Corda, Icon. *l. c.*

On dead asparagus-stems, Edgbaston (Wk.), October. Spores 18–20 μ. Forming deep black patches, on a coloured spot.

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‡ Ex errore *cerealis* in orig.

Description of Plates.

Plate 245. — Fig. 1. *Puccinia ægra*, teleuto-spores, with one uredo-spore × 250. 2. *Peronospora densa*, fertile hyphæ and spores × 250. 3. *Pilobolus œdipus*, spores × 500. 4. *P. Kleinii*, spores × 500. 5. *P. Kleinii*, forma *sphærospora*, spores × 500. 6. *Pilaira Cesatii; a*, a sporange dehiscing in water × 80; *b*, spores × 500. 7. *P. dimidiata; a*, plant with young sporange × 80; *b*, mature sporange × 120; *c*, spores × 500; *d*, columella × 120. 8. *Mucor macrocarpus; a*, fertile hyphæ × 4; *b*, optical section of sporange × 80; *c*, base of branched stem × 60; *d*, spores × 250; at *x* a spore of *M. fusiger* for comparison. 9. *Sporodinia grandis; a*, end of a branch, with the sporangia broken up, leaving the columella exposed × 60; *b*, optical section of sporange × 120; *c*, spores × 220. 10. *Chætocladium Brefeldii; a*, tuft adhering to a stem of *Thamnidium* × 50; *b*, end of a branch × 480; *c*, spores × 500. 11. *Piptocephalis Freseniana; a*, fertile hypha × 12; *b*, first fork of the stem, showing the pseudo-striations × 250; *c*, end of branch × 250; *d*, head with young sporangia, seen laterally, and the same in plan × 500; *e*, chains of spores and single spores × 500.

Plate 246. — Fig. 1. *Ovularia sphæroidea; a*, hyphæ with spores × 500. 2. *Cylindrium Cordæ* × 80; *a*, chains of spores and single spores × 500. 3. *Arthrobotrys oligospora* × 100; *a*, apex of hypha × 200; *b*, spore × 500. 4. *Prismaria furcata* × 160; *a*, spore × 500. 5. *Botrytis coccotricha*, unusual form × 500. 6. *Dactylella minuta* × 80; *a*, spores × 500. 7. *Verticillium quaternellum* × 250; *a*, spores × 500. 8. *Helminthosporium obclavatum* × 250. 9. *Paraspora triseptata* × 500. 10. *Fusisporium cereale*, spores × 500. 11. *Ascobolus minutissimus*, asci and spores × 500.

A VISIT TO THE NORTHERNMOST FOREST OF CHILE.

By Prof. Federico Philippi.

When I arrived here, nearly thirty years ago, I knew the plants of the desert of Atacama better than those of the central and southern parts of Chile, as my father had just returned from his exploring voyage through the desert of Atacama, and they formed from that time for me the most interesting part of the Chilian flora. It was always my wish to see the arid provinces of Coquimbo and Atacama; but circumstances drove me to the south, to the province of Valdivia, where I passed many years, studying the flora as much as my time allowed, and it was not until last year I could follow my wishes and visit the province of Coquimbo.

I started with my son and the stuffer of the museum on the 17th of January, 1883, at 8 o'clock in the evening, in the steamer 'Serena,' for the port of Coquimbo. The voyage was of no interest, the weather fine and clear, so that we could see the coast perfectly well. At 9 o'clock in the morning of the 18th we passed the mouth of the River Limarí, situated 30° 42·4′ S. lat. We perceived on the summit of a high hill on the coast, two miles more or less south of the Limarí, large trees; but we could not see any similar thing on the coast-range north of Limarí, notwithstanding I had been told that there was situated the northernmost forest of Chile, called "Frai Jorge," which excited my interest, as the province of Coquimbo has a nearly desert-like character. Having passed the long point, Leugua de vaca, we came in front of the bay of Tongoi, in which end we could see the houses of the little city of Tongoi, the port

for the famous copper-mines of Tamaya, with which it is united by a railway. Then we passed in front of the bay of Herradura (Horse-shoe Bay), with Herradura on its southern and Guayacan on its northern end, and having rounded another small and hilly point we entered the port of Coquimbo. Coquimbo is situated at the south side of a large semicircular bay, closed to the south by the before-mentioned point, to the north by the far point, Teatinos; and north-east from Coquimbo are visible the towers and higher parts of Serena, the chief city of the province. We disembarked immediately, and went by the next train to Serena.

Coquimbo is a little city of only a few streets parallel to the sides of the square and in part to the shore, having at its back a low hill of limestone, which shelters it against the south wind. The hill ends with the last houses; from there begins as far as Serena, and still farther north, a low, sandy, and in parts swampy shore. The railway passes first the sandy shore, then it enters more to the interior, passing low, wet land, but mostly fenced and here and there cultivated, and enters Serena at its lowest part.

Serena is not far from the shore, but the surge of the sea is just there so strong that it is impossible to land, and Coquimbo is therefore the port for the whole province. Serena is surrounded by farms full of trees, and on the main square and in the gardens of the houses grow many trees, giving a pleasant aspect to the city.

I spent the 19th in the city, while my son went with the stuffer to the shore in search of plants and insects. They brought several insects, and some plants: *Cristaria*, *Solanum*, *Baccharis*, *Scirpus*, *Senecio*, and *Encelia*, but nothing new to me.

On the 20th, at a quarter past seven, we started on horseback, accompanied by a friend, Mr. Münnich, to whom I am much obliged for his aid and kind services, taking our way across the river Coquimbo, which runs north of Serena, very close to it. In the valley grow the plants common in such places in the whole Republic—amongst them were two I had not previously seen in Chile, *Veronica Anagallis* L. and *Helosciadium nodiflorum* Koch. We passed, on the north side of the river, first through a long alley of considerable willow-trees (*Salix Humboldtiana* W.),* and then ascended a low hill, level and nearly bare on the top at first sight, but showing in coming nearer to it a special vegetation. In a pasture ground at the very foot of the hill grew a plant 2–2½ m. high, very similar to hemp, unknown to me, which resulted on examination to be *Franseria artemisioides* W., which only grows in this province, and is used by the peasants as a remedy. On the top of the sandy hill, which was very dry, we found very interesting vegetation —tufts of Cactus, consisting of *Cereus quisco?*, *Eulychina eburnea* (Salm.) Ph., an *Echinocactus* growing in large heaps, forty to fifty individuals being agglomerated together, and in the midst of

* The only species of this genus in South America, found from the Pacific to the Atlantic Ocean, and from New Granada to the Straits of Magellan. It is the largest tree in the province of Coquimbo, where it grows in nearly all wet and low places, and attains sometimes enormous dimensions. It should properly bear the name of *S. chilensis* Mol.

these plants grew an *Opuntia* with small, plain-like segments and orange-coloured flowers. There were bushes of a curious aspect, from a low stem 10–15 cm. high, and not surpassing 5 cm. in thickness, spread out several branches inclined upwards, then nearly vertical, rarely a little branched, covered as the stem with a reddish grey bark, without any leaf, full of small tubercles all along; I could not understand at first what it might be, until *Oxalis gigantea* Barn. came to my mind, and somewhat farther on I found some flowers at the end of a branch, which confirmed my supposition. In little crevices and at the end of the plain grew some shrubby Heliotropes with milk-white flowers, *Heliotropium stenophyllum* DC. var. *glabrum*, *Eupatorium foliolosum* DC., the yellow-flowered *Pleocarphus revolutus* Don, *Encelia tomentosa* Walp., *Chorizanthe glabrescens* Benth., *Fagonia chilensis* Hook. & Arn., and a species of *Dolia* without flowers. We found no herbaceous plants, but, to judge from the dry stems, &c., on the ground and what the people told me, there must exist in spring, when the winter has been rainy enough, a very abundant and pretty herbaceous vegetation, partly of annuals, partly of bulbous plants, with brilliant flowers, amongst them many *Amaryllideæ*.

We descended soon into a narrow sandy valley, with the ground here and there wet, and we found here *Lippia canescens* Kth., *Malva sulphurea* Cav., a low *Frankenia* with large flowers (for the genus), probably *Nicoletiana* Gay. On downs at our left grew a *Tylloma*, and a *Chætanthera* with white rays. Several huts and houses lie in this valley, but we passed it in half an hour without stopping, and turned then westwards through level sandy land to punta Teatinos. The only plants here which we had not observed yet were the low *Cassia obtusa* Clos., *Proustia pungens* Poepp., and some bushes of *Ephedra*, greatly eaten by goats, which are frequent in these dry regions, where no other cattle would prosper. Point Teatinos is a granitic hill nearly 50 m. high, and level and sandy on the top. We went up, and leaving our horses we descended down to the sea. The vegetation is scarce, but not without interest; we met with one specimen of *Ledocarpum pedunculare* Lindl. with flower, and *Eugenia maritima* Barn., a shrubby myrtle of scarcely 50 cm. high. In the sandiest places were growing different *Cactea*, two species of *Cereus*, one *Opuntia*, and the gregarious *Echinocactus*, but nearly entirely without flowers. Near the sea grew some half shrubs with fleshy leaves, but without flowers, probably belonging to the *Nolanaceæ*.

On our return to Serena we followed the sandy shore, which is separated from the land by low wave-like heaps of sand, upon and between which grow little shrubs of *Cristaria glaucophylla* Cav., *Tetragonia maritima* Barn. var., *Dolia salsoloides* Lindl., this last forming thickets of about 1 m. high, and of considerable extent. At three o'clock we came to the mouth of the River Coquimbo, which is here but a small creek with clear water, and which we passed easily, following on its south side upwards to Serena. In the valley we found the common flora of such places, being the only interesting things the *Gerardia genistifolia* Cham. & Schlect., very

similar to a *Pentstemon*, 1½ m. high, covered with rose-coloured flowers, and a large *Astragalus* with pale yellow flowers.

The next two days I was occupied with the drying of the plants, so that I could not move from Serena; but my son went with the stuffer up to the plain above Serena, and brought me several interesting plants, amongst them *Cæsalpina angulicaulis* Clos., two species of *Chorizanthe*, different shrubby *Synantheræ*, *Oxalis gigantea* Barn., and a nice little *Oxalis* with a thick fleshy root, and only flowers, entirely without leaves, which I think new; *Plumbago cærulea* H. B. Kth., and large specimens of *Heliotropium curassavicum* L., *H. stenophyllum* DC., and a woody *Atriplex*.

On the 24th we started with the train for Ovalle, where I wished to examine the northernmost forest of Chile, called Frai Jorge. We started at eight o'clock, and went first to Coquimbo; then the line runs to the east, and afterwards southwards, crossing the mountain of Las Cardas. From Serena to the foot of Las Cardas the line passes through a plain, scarcely covered with shrubby vegetation. Near Coquimbo grow *Heliotropium stenophyllum*, *Pleocarphus*, *Argemone mexicana*; farther on the vegetation consisted of *Haplopappus*, *Brachyris*, *Chuquiraya*, and such things; and on sandy places grow many *Cacteæ*, forming here and there nearly the whole vegetation, then of a striking aspect; the *Cereus* were often thickly covered with the nice *Loranthus aphyllus* Miers, whose red flowers were brilliant like fire. On some places grow *Muhlenbeckia chilensis* Meisn., *Cestrum Parqui* Hér., *Colliguaya odorifera* Mol., *Lithrea venenosa* Miers, *Flourensia thurifera* DC., which I had not observed near Serena and near Las Cardas; *Acacia Cavenia* Mol. became somewhat abundant, and a low *Cassia* was here and there scattered amongst the other shrubs. Of herbaceous plants I saw only some purple *Habranthus*. This whole plain is very waste, the plants being widely scattered over it, and deficient in any herbaceous vegetation. In spring (Sept. to Nov.) the whole plain must be thickly covered with grass full of flowers, as I have been told, but that only occurs when the winter has been rainy.

Before we ascended Las Cardas I obtained permission to stand on the platform before the engine, and so I could see the line and the vegetation along it. The line describes many curves in its ascent, and one might think more than once to enter again the station of Las Cardas; but it goes slowly but steadily upwards, on one place with an ascent of 1 in 20, until the top is reached. As the train runs very slowly, I could observe well the vegetation, which is formed by *Cordia decandra* H. & Arn. covered with many snow-white blossoms, *Fuchsia rosea* R. & P., *Cæsalpina angulicaulis* Clos, a shrubby *Adesmia*, a white *Loasa*, an *Azara* (if I saw well), a *Colletia*, many *Oxalis gigantea* Barn., and some *Fabiana* shrubs. Descending from the top we entered a valley running south, with willows, *Cestrum*, *Escallonia coquimbensis?*, *Acacia Cavenia* Mol., Algarrobos (*Prosopis siliquastrum* DC.), and *Baccharis*, but nothing of special interest. At the first station under the top of the hill I entered again in the waggon, as the vegetation in the whole valley

was the same, and uninteresting. In Higueritas enters a branch of railway from the mining district of Panulcillo, not far from here. Having passed the little village Angostura, the line abandons the valley and descends to the River Limarí, following its northern side to the village Huamalata, where it ends, nearly a league distance from Ovalle. The stations between Coquimbo and Huamalata are only some houses, except Penon, from where coaches run to Andacolla, famous for its gold-mines, and Angostura, south of Las Cardas. Characteristic of this part of Chile are the heaps of copper-ore in many stations, which seem to be established only for embarking the ores. At Huamalata an old scholar was waiting for me, *viz.*, Don Amable Caballero, of Ovalle, who had a carriage ready to bring us with the luggage to Ovalle, where we arrived at half-past twelve, and found a good quarter in a newly erected hotel.

Ovalle is situated in the valley of the River Limarí, at the foot of the hills bordering it on the north side, at some distance from the river itself, and makes an agreeable impression when one sees it from the surrounding hills. We spent here three days, making short expeditions in the neighbourhood, and tried to obtain the necessary horses to go to Frai Jorge. Thanks to the kindness of S. Caballero, we made the acquaintance of Senor Barrios, to whom belongs the greater part of Frai Jorge; this gentleman offered us four horses, and another was obtained from an old friend I found here, so that we could start on the 28th for Frai Jorge.

The vegetation around Ovalle is of two kinds, that of the valley and that of the hills. The valleys of the rivers in this province are all very similar, of more or less breadth, with level bottom, the channel of the river sometimes nearly dry because all the water is turned off by the channels for irrigation, winds from one side to the other; the ground is formed of pebbles of different size intermixed with sand, and only on the foot of the hills there is a strip of ground formed of common earth and arable, and, notwithstanding, the valleys are very fertile. The vegetation of this part consists of different species of *Baccharis*, *Maytenus boaria* Mol., *Psoralea glandulosa* L., *Eugenia Chequen* Hook. & Arn., and willows; on wet places grow the swamp plants found everywhere in Chile, with *Phragmites communis* Trin., and *Gymnothrix chilensis* Desv., peculiar to Northern Chile.

The hills in this part show amongst many other plants the interesting *Alona rostrata* Lindl., *Dolia vermiculata* Lindl., *D. salsoloides* Lindl., a shrubby *Atriplex*, *Suæda divaricata* Moq., *Lycium chilense* Miers, *L. rachidocladum* Dun., several Frankenias, *Gymnophyton robustum* Clos., and a low *Oxalis* with flowers from a long, thick, fleshy root, without leaves, perhaps the same species as that of the plain above Serena, a *Solanum* with pinnatifid leaves, *Malesherbia paniculata* Don, and *Cordia decandra* H. & Arn.; and the only Chilian Papayacea, *Vascomellea chilensis* Planch., called "palo gordo" (fat stick) by the people. The palo gordo is a rather curious plant, 2–3 m. high, the stem about 20 cm. thick, abundantly branched, with a grey epidermis, smooth as butter, and full of a thick white milk; in this time it bears only its small unisexual flowers, but no

leaves at all; these appear only in spring-time, falling down as soon as the dry season begins. On the level parts at the foot of the hills grows also the *Duraua dependens* DC., which attains here a much larger size than I ever have seen in the south, and is here called "Molle."

We started on the 28th at half-past five in the morning, accompanied by M. Caballero and a son of S. Barrios Don Belisario, who were kind enough to accompany us as guides. The road runs for nearly two hours in the valley of the Limarí, offering nearly nothing of interest, as we passed all that time between mud walls, which are here in use for enclosing the fields; then we ascended some 6 to 7 m. to the plain at the foot of the hills north of the river, and followed this until midday; and we had from this part a nice view over the green valley of the Limarí, with its plantations and houses, making such a fine contrast with the barren hills on both sides of the valley, on which the eye finds only here and there in a little side valley some green spots to repose upon. At the foot of the hill, owing to an irrigating channel running higher upwards, was a comparatively abundant vegetation, but of the same plants as occur everywhere in similar conditions in these parts of Chile; on one place our attention was called to the purple flowers of an *Oxybaphus*, which we could not preserve as we had no paper at hand, and in the vasculum they shrunk so much that we threw them away.

At nine o'clock the plain at the foot of the hills became broader and dryer, and from here we found many places covered with different *Cactaceæ*, and a spiny *Adesmia* 1½–2 m. high, also very abundant. This *Adesmia* is here called "Barilla," the general name for all the Adesmias in the north, and although it is similar to *Adesmia arborea* Bert., the commonest kind of this vast genus near Santiago, its habit is quite different, and it may easily be a distinct species. At the foot of the hills are disseminated, north and south of the valley, several little villages and hamlets, nearly all with a church in the centre, consisting mostly of simple and of ten miserable huts, in midst of which the large and well-built houses of the great proprietors attract attention.

From eleven to three o'clock we rested at the house of a relation of M. Belisario Barrios, who attended us with the proverbial hospitality of the north. From this house, called Algarrobo, we left the valley of the river to our left, internating us in the mountain. We mounted in a narrow valley until we reached a kind of plateau, perhaps 100 m. over the valley of the Limarí, and followed it for some time westward, descended then into another valley running likewise north to south, and crossed then a range of hills running in the same direction, reaching at seven o'clock in the evening a third broad valley on the eastern foot of Frai Jorge, where we rested for the night.

The hills between Algarrobo and the eastern foot of Frai Jorge show on the plain above a scarce and poor vegetation, nearly entirely formed of low shrubs of the *Compositæ*, some Ephedras nearly destroyed by grub, and Adesmias, which became very fre-

quent near Frai Jorge, scattered *Eulychnia*, *Opuntia* and a few *Echinocactus*, amongst them some very large specimens of the Sandillon, *Eriosyne Sandillon* Ph., which attains sometimes nearly 1 m. diameter and 80 cm. height. The flora in the little ravines and on the slopes of the hills is more interesting, for it contains, besides the already mentioned plants, "Carbon" (*Cordia*), "Palo blanco" (*Fuchsia rosea* R. & P.), "Monte gordo" (*Vascoruckea*), *Sphacele Lindleyi* Bth., called "Salvia," some *Proustia* and *Aster breviflorus* Ph., called "Escabiosa." In the second valley we found a splendid little oasis, formed of *Maytenus* and *Duranca dependens*, and farther down at some distance could be distinguished the summits of poplar trees, the sure indication of human dwellings in the littoral half of Coquimbo. Whilst the first part of our ride was through comparatively populated land, the second half was through a desert, because there were only a few huts near Algarrobo, and between these and the foot of Frai Jorge we passed only one hut in the second valley.

The houses of Frai Jorge are situated at the eastern foot of the granitic mountain of the same name, in a nearly broad valley, and are surrounded by fruit-trees of different kinds; behind the house is a little swamp, which gives rise to a small current of water, by which it is possible to have some cultivation. At the lower part of the swamp near the house is a cluster of *Arundo Donax* full grown, and the upper end of the swamp is full of splendid specimens of the Panguo, *Gunnera chilensis* Lam., with leaves more than 1 m. broad, some reaching a diameter of nearly 2 m. The first thing we did on arriving at the house was to ask for the forest of Frai Jorge, and we were told to look up the hill to the west; we saw its summit covered with dense but interrupted clouds of fog, and on the clear places we could well distinguish the long-searched-for forest of Frai Jorge.

I was much interested to know Frai Jorge from my own examination, because I had received the most contradictory information, not only about its situation,—being put by some north, by others south of Limarí,—but also about its flora; some people had assured me that the wood contained "Roble" (*Fagus obliqua* Mirb.) and "Reuli" (*Fagus procera* Poepp.), both plants which do not pass north of 33° of south latitude.

The next morning we looked first at the top of Frai Jorge, but found it entirely hidden by a fog which hung far down on the slope of the mountain, and which lasted the whole day. Seeing that the weather would not change, we mounted on horseback, and started at nine o'clock. We went round the swamp behind the house, which contained out of the already mentioned *Gunnera* the most common swamp plants, *Scirpus*, *Malacochate*, *Cotula coronopifolia* L., and similar things, and many Frankenias, here called "Sosa"; then we passed a little hill and went into the narrow valley, Las Vacas, where we met with *Eryngium paniculatum* Lar., and a shrub with slender branches and bright leaves, bearing black fruit and pale bluish flowers, which was called "Uvillo" by our companions. At first I could not make out what it might be, but soon I recognised

it to be the very interesting *Monttea chilensis* Clos., considered by some botanists as a Solanacea, by others as an anomalous Bignoniacea, which I never had seen before, except in dry specimens. In the coarse sand at the bottom of the valley grew species of *Tylloma* and *Gnaphalium*.

From here we began to ascend to Frai Jorge, whose height I estimate to be from 1000 to 1200 m., where we arrived at 11 o'clock. In this part of the road we found many *Adesmia*, the same as the day before, *Eupatorium Salvia* Colla, *Fuchsia rosea*, two species of *Proustia*, and many frutescent *Synantherea*, amongst them *Haplopappus foliosus* DC., *Gochnatia pyrifolia* Don, *Tylloma glabratum* DC., then *Linum Chamissonis* Schiede, *Asteriscium chilense* Cham. & Schltd., *Margyricarpus setosus* R. & P., a low woody *Chorizanthe*, and two species of *Puya*, becoming more frequent as we approached the height. The two Puyas are *P. gigantea* Ph., with yellow flowers and glabrous green leaves, and *P. coarctata* Gay, with leaves so full with fine grey scales that they appear nearly grey instead of green. Flowers are seldom seen, as the cows take the peduncles with their horns and bend them down for eating the inflorescence; a white transparent gum exudes from the prostrated stems of *P. coarctata*, which is in high esteem amohgst the peasants as a medicine.

As we could ride only slowly, I looked at every *Adesmia* in the hope of finding specimens of the very interesting Chilian *Rafflesiacea*, *Pilostyles Berterii* Guill., and we succeeded and found two or three specimens. This is a true parasite, living in the bark of *Adesmia*, and showing nothing more than its little purple flowers, which come out of fissures in the bark. I thus found at last a plant for which I had looked since my arrival in Chile in nearly every arborescent *Adesmia* I met in the many voyages and botanical excursions I had made. At eleven o'clock we reached the mountain, and entered in the fog, which had risen higher and higher, but did not disappear from the top in the whole day. The top is nearly flat, covered with a thick forest, which descends on both sides to a considerable distance, but only as far as the point where the fog reaches, which exists the whole year, and which is the only cause that a wood may exist in this dry region; on the sea side the wood descends farther than on the eastern slope, where it is wanting in some places entirely, and in the lower parts of the summit it is likewise wanting. It extends from the River Limarí 12 km. north, with a breadth of 4 km. in its broadest southern part, and a general breadth from 400 to 650 m., as our companions told us, for I had only occasion to see a very small part of it.

The hill or rather the mountain of Frai Jorge forms the border of the sea; it extends from the mouth of the River Limarí to Lengua de Vaca, in the port of Tongoi, and has an elevation of 1000 to 1200 m. approximately, and falls in the west directly down to the shore of the sea, where it leaves only a narrow strand.

Some hundred metres (200 to 300 perhaps) before we reached the wood the aspect of the vegetation suddenly changed. Large patches of a leafless low *Colletia*, a *Pernettya* without flowers or fruit, *Acæna ovalifolia* R. & P., bushes of *Baccharis concava* DC., a *Berberis*

recalling *B. Darwinii* Hook., but new, a low *Ribes*, and many patches of *Margyricarpus setosus* R. & P., which was scarce on the slope and only found near the height, *Eupatorium salvia* Bolla, and *E. glechonophyllum* Less., formed here the flora; so that it appeared partly like the flora of the centre, partly like that of the south.

Then we entered the wood, which consisted chiefly of *Aextoxicum punctatum* R. & P., of big but not very high stems, inclined eastwards by the sea-breeze, and branches almost from the base. In the midst of these grew abundantly young plants of the "Canelo," *Drimys chilensis* DC. The borders of the wood were formed by two species of myrtles new to me, called "Roble" and "Roblecillo," *Citharexylon cyanocarpum* H. & Arn., *Kageneckia oblonga* R. & P., and *Azara microphylla* Hook. f. The wood was dropping with water, the ground densely covered with mosses, and on the stems and larger branches grew a thick vegetation of lichens, both identical with those of Valdivia. We found also a *Loasa*, perhaps *acanthifolia* Lam., but only with one faded flower; *Nertera depressa* Banks, a little *Peperomia* with whorls of bright green leaves, and the following Valdivian ferns:—*Phegopteris spectabilis* Fée, *Asplenium magellanicum* Kaulf., *Blechnum ciliatum* Presl, *Goniophlebium synammica*, Fée, *G. californicum* Fée, and *Aspidium coriaceum* Sw. On a place where a little spring arose I found an *Uncinia*, *Gunnera*, and *Mitraria coccinea* Cav. with hundreds of its scarlet blossoms; and upon most of the *Aextoxicum* grew large plants of *Decostea scandens* R. & P.

We went northwards, following always the summit, but we had so many things to notice and collect that we did not go very far; and at three o'clock we descended by another way to the valley of Las Vaccas, which we reached farther up from the place where we had crossed it in the morning. Before we left the height we had for some time a splendid view of the Pacific and the shore, and found on our way two *Boldoa fragrans* Gay, and a tuft of *Chusquea*; and the guide told us that in the southern part of the wood existed "Lingue" trees (probably *Persea Meyeniana* Nees), and many large *Drimys*. Before turning back we passed a place where a saw-mill had been built, but the mill has been taken away, and M. Barrios does not allow anyone to cut timber now; so it is to be hoped that this oasis of southern vegetation and northernmost wood of Chile will remain for many years.

Our descent was not very interesting, as we saw the same plants, only in inverse order, except that we saw near the height large parts of ground completely covered with *Puya gigantea* Ph., the best haunt for Chinchillas as I was told. In the valley of Las Vaccas we met with many "Jarilla," *Larrea nitida* Cav.

On the 30th we rode back to Ovalle, following at first the same way we came; but after about two leagues we turned to the north-east, to reach the little village of Cerrillos, situated at the foot of the hill of Tamaya, so famous for its copper-mines and stations on the Tongoi-Tamayan Railway. Near the house of our host, Don Pedro Barrios, we found *Pilostyles* growing abundantly on the Adesmias, and I secured a good many specimens for exchange. The road passes amongst low, flat-topped hills, with the same

scarce vegetation as we had met with from Algarrobo to Frai Jorge. The plain of Cerrillos, which we reached at half-past ten, has a somewhat different aspect, being covered with lower shrubs, amongst which *Chuquiraga aciculatis* Don is the most abundant. Before we reached this plain, Don Belisario showed us, at 500 m. from the road, an enormous willow-tree, which four men can scarcely span with their arms. From Cerrillos we took the diligence to Ovalle, sending the horses with the servants.

Cerrillos is a little village at the foot of the famous Cerro de Tamaya, and from here ascends the railway from Tongoi to the copper-mines situated very high up the hill. The little village offers nothing of interest, neither were there on the way to Ovalle the slightest things of interest. We arrived after $2\frac{1}{2}$ hours' voyage at Ovalle, early enough for arranging the collected plants and for taking leave of our acquaintances, and for thanking the gentlemen by whose kindness we had been enabled to reach the forest of Frai Jorge.

The following morning all our treasures were packed, and at noon we started again for Serena, where we stopped only a few days for finishing the drying of our plants and for making the preparations for a voyage to the baths, Del Toro, situated near the Chili-Argentine boundary at a considerable height. This voyage was likewise of great botanical interest, and perhaps I may give at some time an account of it, if agreeable to the readers of this Journal.

The forest of Frai Jorge is one of the most striking facts of distribution of plants and botanical geography. The flora of the province of Coquimbo, which extends from 29° to 31° 75′ S. lat., is nearly a true desert flora, very alike to that of the more northern province of Alacama, and in the midst of it exists this wood formed nearly entirely of southern plants! *Aextoxicon* has hitherto not been found farther north than the neighbourhood of Valparaiso, and *Decostea scandens* occurs, as it seems, only on the coast from Constitution, 35° 20′, to the bay of Arauco, 37° 15′; and *Azara microphylla*, the arborescent *Citharexylon*, the ferns, mosses and lichens, *Nitraria*, *Nerteria*, and *Uncinia*, are veritable southern forms, which nearly all occur scarcely farther north than the 36th degree, while some of them probably do not reach it. The *Berberis* outside of the forest is much more like the southern form as *Darwinii* than those of Central Chile; the *Colletia* found there is much like to a species of the sandy shore of Auraca; and indeed the whole aspect of Frai Jorge is that of a Valdivian or Chiloi forest more than of anything else. And with these plants grow *Eupatorium glechonophyllum*, *Linum Chamissonis*, and *Kayeneckia oblonga*, which belong to the central flora.

The mean temperature of Valdivia is of 11·01° Cels., and the mean rainfall of 2557 mm., after four years' observation; and two years' observation of Chiloe shows a rainfall of 1320 mm. The mean rainfall of Serena is of 38·6 mm., and the mean temperature of 17·75 Cels. (four years' observation).

It is thus very remarkable that in the midst of a desert flora there exists an oasis of southern plants. Two questions suggest themselves: how can these southern plants live there, and where did they come?

That these plants can grow there and thrive well is explained by the thick fogs which are hanging nearly the whole year on the summit of the mountain, the nearly complete coincidence of the limit of the forest with the limits of the fog being a sufficient proof of this. These fogs are frequent on the Chilian coast from 31° 30′ S. lat. to the north, but only to a certain height, where they allow a luxuriant flora in some parts; and on the south of the Limarí there exists a mountain, called Talinai, which is nearly as high as Frai Jorge, and equally covered with wood; but the wood is not so extensive, consisting, as I have been told, of the same species as that of Frai Jorge.

But how may it be explained that these plants appear here so far from their true home? Have the seeds perhaps been brought from the far south by wind, or have they been carried by birds which had eaten the fruits and sown the seeds? None of these reasons can be admitted, because there are none amongst these plants whose fruits or seeds are adapted for distribution by wind, nor is there a single one which is eaten by birds. And if this last case could have happened, it is not probable that birds would be able to carry seeds for so long a distance in their intestines; they would have ejected them with their excrements long before they had passed half the distance.

Or, has the climate of Chile in other times been different from what it is now? Have there been frequent rains and fogs, accompanied by a cloudy sky, which allowed the coast-range to be covered with woods, which by a change of the climate have died away, remaining only the forests of Frai Jorge and Talinai as witnesses of the ancient luxuriant flora? Or are there forests of very ancient origin, remnants of that time, in which only the actual coast-range emerged out of the sea, forming long rows of islands with maritime and insular climate, which was similar to the actual climate of Chiloé and the islands of Western Patagonia? and has the raising of the high Cordillera changed the climate to what it is now?

All these questions came to my mind when I was looking for an explanation of the origin of the forest of Frai Jorge, and I found no definite answer to any one of them; the most probable seems to me that the climate of Northern Chile has been quite a different one in former times. But, then, why does there not exist any trace of a former abundant and forest vegetation south of Talinai? I never heard of other forests in these regions, except the ones above mentioned.

ON THE NOMENCLATURE OF *GAGEA*.

By James Britten, F.L.S.

A reference to the paper in which Salisbury established the genus *Gagea* ('Annals of Botany,' ii. 33) in 1806 brought to my notice the fact that our British representative of the genus, usually known as *G. lutea* Ker, should, in accordance with the law of priority, bear the name of *G. fascicularis* Salisb., Ker's name dating 1809 (Bot. Mag. t. 1200), while Salisbury's is three years earlier.

It is true that Salisbury seems to have thought the *Ornithogalum luteum* of Linnæus distinct from *O. luteum* Sm., placing the former as a synonym of *O. pratense* Pers. (*G. bracteolaris* Salisb.); but Schultes and other writers have not followed him in this, but have considered Smith's plant identical with that of Linnæus, retaining *O. pratense* as distinct under the name of *G. pratensis* Schultes.

Salisbury's paper seems to have dropped out of notice; Schultes (Syst. Veg. vii. 556), who is quoted by Nyman and others as the authority for many species of *Gagea*, does not once refer to it. Of the seven species published by Salisbury, four are by Koch referred to Schultes' species as synonyms, the rest being ignored. But as Schultes did not publish until 1829, while Salisbury's names date from 1806, it is clear that the former must, when different, disappear, and when identical stand as of Salisbury, not of Schultes. It may be worth while to enumerate the seven species here, with an indication of the reference they bear to the names of Schultes:—

G. FASCICULARIS Salisb. (1806). (*Ornithogalum luteum* Sm.) = *G. lutea* Ker. (1809).

G. BRACTEOLARIS Salisb. (*O. pratense* Pers.) = *G. pratensis* Schultes 1829).

G. STELLARIS Salisb. (*O. arvense* Pers.; *O. minimum* L.) = *G. arvensis* Schultes. *G. minima* Schultes.

G. SPATHACEA Salisb. (*O. spathaceum* Hayne; *O. Heynei* Roth.; *O. pusillum* Schmidt.) = *G. spathacea* Schultes.

G. PYGMÆA Salisb. (non Schultes). (*O. bohemicum* Willd.) = *G. bohemica* Schultes.

G. BULBIFERA Salisb. (*O. bulbiferum* L.) = *G. bulbifera* Schultes.

G. RETICULARIS Salisb. (*O. reticulata* Pall.; *O. circinatum* L.). = *G. reticulata* Schultes.

G. pygmæa Schultes, non Salisb., must be replaced by *G. nivalis* Huet., which Nyman gives as a synonym.

SHORT NOTES.

ARUM ITALICUM Mill., IN DEVON.—The ocurrence of this plant in four of the southern counties of England lying east of Devon, as well as in West Cornwall, led me to expect that some day it would be found to be also a Devonian species. In the last week of May my expectation was realized, through my coming across several plants of it when cutting down some nettles and other rank vegetation and long grass that had grown up among and around the bushes of a low hedge separating a shrubbery and meadow at Fursdon, in the parish of Egg Buckland, between three and four miles from Plymouth. Although growing very near an old house, and in a locality the ancient choice of which for a human habitation is proved by the meadow in question still bearing the name of Undertown, I yet incline to the opinion that the plant is as indigenous there as the other species, *Arum maculatum*, with which it grows, the association of the two giving

prominence to the noticeable feature of the later flowering of the *italicum*, some of the spathes of which were unexpanded when I found it. Fursdon examples agree well on the whole with the plate, no. m.ccc.xciii., of 'English Botany,' ed. 3, the leaves being without spots, as there represented, though in colour of a deeper green. I look on this plate as one of the best of the new ones in the work, and it is certainly greatly superior to the reproduced one of *A. maculatum* preceding it. The odour of the inflorescence of *A. italicum* is, at a certain stage of its development, very disagreeable, reminding one of that of putrid meat. The station at Fursdon is about four miles from the coast, and so, I think, further removed than most of its other English stations. Whilst sending this first positive record of the occurrence of the plant in Devon, I think it right to repeat a note inserted by Mr. Keys in his 'Flora of Devon and Cornwall; he says, "*Arum italicum* Mill. has been reported to me as having been found near Kingsbridge, Devon, but not, I fear, on sufficiently good authority to justify its insertion here."—T. R. Archer Briggs.

[This seems to be the right place in which to say that the Torquay specimens exhibited as *Arum italicum* at the Linnean Society, April 19, 1883 (Proc. Linn. Soc., 1882–83, p. 8), proved to be only a state of *A. maculatum*.—Ed. Journ. Bot.]

Lilium Martagon in Gloucestershire.—In April last I found a tolerable quantity of *Lilium Martagon* in the old woods on the Gloucestershire bank of the Wye, associated with *Paris quadrifolia* and *Allium ursinum*. I afterwards learnt that it was not unknown to the cottagers in the neighbourhood, and I was directed to a clump of the same plant in another part of the woods farther from the river. The woods are aboriginal, and the brushwood is only periodically cleared. Moreover, the locality where I first found the plant is deep in the woods, a long way from any human habitation; therefore, if it is not native,—and it appears to be quite as native as the *Paris*,—I should be glad if any one could tell me how it got there.—H. A. Evans.

Trichomanes radicans in Donegal.—On the 25th May last Mr. Pierce Mahony, while following his duties in connection with the Irish Land Commission, discovered the Killarney fern in a valley in north-west Donegal. Miss Grove, of Castle Grove, has also seen it in the same valley, and specimens have been sent to Dublin. I think it advisable to withhold the exact locality. This information has been given me by Mr. Ulick Bourke, Irish Land Commission.—H. C. Hart.

Crepis biennis in Middlesex.—A few weeks since I met with *Crepis biennis* growing rather plentifully on a bank beside the path leading from Pinner Road to Pinner Hill; and last week again found it growing abundantly in the meadows above the brick-fields near Harefield. In Old Park Wood adjoining I also found *Carex strigosa* in some quantity. On referring to the 'Flora of Middlesex' I find that *Crepis biennis* has only been recorded for the county as a casual introduction, and *Carex strigosa* once only from Pinner, a station about six miles distant.—John Benbow.

CAREX LIGERICA Gay IN W. NORFOLK.—Mr. A. Fryer, of Chatteris, has sent me specimens of the above *Carex*, gathered at Castle Rising, in West Norfolk, by Mr. Balding. Wherever any *Carex* is gathered, allied to *C. disticha* Huds., but differing from it in character, it would be well to ascertain whether it may not belong to this plant, which has a habit somewhat intermediate between *arenaria* and *disticha*.—ARTHUR BENNETT.

ÆCIDIUM JACOBÆÆ Grev. — This fungus has hitherto been regarded both in this country and abroad as being either a state of *Puccinia glomerata* or of *P. compositarum*. During the past few years I have been led to doubt the truth of this, from a variety of reasons which it is unnecessary here to mention. Suffice it to say that by direct experimental cultures I find it to be a true heteroecismal uredine, the puccinia and uredo of which occur upon *Carex arenaria*. This *Puccinia* is totally distinct from *P. caricis*, from from which it can be readily distinguished by the naked eye. It is more nearly allied to *P. dioica* Magnus, but whether distinct or not from this species I can at the present moment hardly say.—C. B. PLOWRIGHT.

ÆCIDIUM RANUNCULACEARUM DC. — There are several species of heteroecismal uredines which have their æcidia upon various species of *Ranunculus*: these have in bygone times been lumped together under the name *Acidium ranunculacearum*. Schröter first pointed out that the æcidium on *R. ficariæ* was a heteroecismal uredine which had nothing to do with *Uromyces ficariæ*, the fungus to which Fuckel, Cooke, and others had affiliated it, but, on the contrary, was a spore-form of *Uromyces poæ*. At the present time the generally-accepted view of these æcidia is that given by Winter in the last edition of Rabenhorst's 'Flora' as follows:—"*Uromyces poæ* has its æcidius on *Ranunculus ficariæ*; *U. dactylidis* on *R. bulbosus*, *R. repens*, and *R. acris*." Cornu has, however, recently shown that one of the reed pucciniæ (*P. arundinacea*) has also its æcidium on *R. repens*; while Rostrup and myself inclined to the idea that *U. poæ* has its æcidium upon this plant. During the past two years I have made a series of experimental cultures with a view of, if possible, setting the question at rest. These experiments are not at the present time complete, but I have evidence to warrant the following statements:—1. That there are two æcidia upon *R. repens*; (*a*) that of *Uromyces poæ*; (*b*) that of *Puccinia Magnusiana*. 2. That the æcidium of *U. dactylidis* is confined to *R. bulbosus*. 3. That the æcidium on *P. acris* probably belongs to a *Puccinia*.—CHARLES B. PLOWRIGHT.

REPORT OF BOTANICAL EXCHANGE CLUB FOR 1882.

[We quote the following notes from this recently published Report, which appears under the editorship of Mr. W. H. Beeby, the "distributor" for 1882. Most of the notes depend for their interest upon the specimens which they are intended to accompany: some, we venture to think, are hardly worth printing, such as the

statement that a plant sent as *Neslia paniculata* is *Bunias orientalis*. Our readers will share the regret of the members of the Club that the delay of Dr. Boswell's criticisms, which partly accounts for the lateness of the Report, was caused by his illness.]

Lepidium Smithii Hook., var. *alatostyla* Townsend.—"This form, which was described by Mr. Townsend in the Hants Flora (1883), was first noticed by me several years ago, growing in some plenty, along a bank on the coast, near Redbridge, Hants, but I have not met with it elsewhere. The present specimens were collected in the same locality by my sister, Miss M. Groves, in May and June, 1882. The usual notch at the apex of the pouch is entirely wanting in this form."—J. Groves. "A very remarkable plant, probably deserving to be considered a subspecies if it comes true from seed. The entire pods are considerably more swollen below than in *L. Smithii*, the fruit-peduncles are shorter, and the rachis has longer hairs. The name is an unfortunate one. If a nominative specific name with a capital letter, it ought to be *Alatistylus*; if an adjective, *alatistylatum*."—J. T. Boswell.

Ononis arvensis L., var. *repens* L. Cat. — *O. maritima*? Dum.—Sand Dunes, near Yarmouth, E. Norfolk. "Since my 'Notes on Norfolk Plants' (Journ. Bot. 1881, p. 358) appeared, I have ascertained that this plant is the *O. maritima* Dum., as I thought, and that by sending specimens to Prof. Lange, of Copenhagen, labelled '*O. repens* L., var. *horrida* Lange?' (a name from Willkomm and Lange's Prod. Fl. Hisp.). In his answer he writes, 'It is exactly what I do mean by var. *horrida*'; and he very kindly sent me a paper on this plant, entitled 'On the synonymy of several species of the Flora of Denmark and the neighbouring countries,' by Prof. Lange. This is in Danish, but a French abstract is also given. It is too long to quote in detail, but I may mention that he calls the plant—

O. repens L. (*a*), *inermis* Lange. (*b*), *horrida* Lange.

(*a*) occurs in Spain, France W., Belgium, the Friesian Islands, and England (Mona—Isle of Man? or, it may be the Welsh Island?), Dill, Cornwall, Plukenet's locality not indicated, Woolwich, Gravesend, Deal, Yarmouth (Ray); (*b*), W. France (Lloyd), Sables d'Olonne (Vendée J. Letourneau), and now may be added Spain. Prod. Fl. Hisp. vol. iii. p. 394. England—Norfolk! Suffolk! The specimens sent from Cornwall by Mr. Varenne as *O. arvensis* b. *repens* probably belong to var. *a*, but there is no ripe fruit, so that it is a little uncertain. As to the name *O. repens* L., for a full and detailed account I would refer to Prof. Lange's paper, entitled 'Bidrag til Synonymiken for nogle kritiske Arter fra Danmarks og Nabolandenes Floraer, af Joh. Lange, Kjobenhavn, 1873,' pp. 25–42. One extract only I should like to give: 'M. Wallroth, qui a fourni de précieux matériaux sur les espèces de ce groupe, et qui a mis en doute l'identité de l'*O. repens* et de l'*O. procurrens*, a déjà adressé une invitation à ses collègues d'Angleterre, pour les engager à rechercher si la plante qui croît sur les côtes anglaises doit être réunie à l'*O. procurrens*, ou en être séparée comme une espèce distincte; *mais cette invitation est restée jusqu'à présent sans résultat*.' This is to be regretted, written as this was in

1373. Will British botanists *now* search out these forms and help Professor Lange?"—ARTHUR BENNETT. On subsequently sending Mr. Bennett ripe fruit of Mr. Varenne's plant, he writes, "I now think it *O. repens*; it will belong to *a. inermis* Lange, Prod. Flor. Hisp., spinis omnino carens'; while my Norfolk specimens belong to '*b. horrida* Lange, Prod. Flor. Hisp., spinis sat crebris ½–1 pollicaribus, horizontaliter divergentibus arcuata.'"

Pyrus scandica Syme?—Great Doward, Herefordshire, 2nd June, 1882. Two small trees in rocky limestone woods; unquestionably native. This agrees exactly with a form found in Piercefield Park, Monmouthshire, and which was named for me "*latifolia*" by Mr. J. G. Baker. It appears to me to come nearer "*scandica*."—A. LEY. I queried this as *latifolia* or *Aria*, and Mr. Archer Briggs replies: "Certainly not *latifolia*, which I know well. I believe it ought to go under *Aria* or *rupicola*. Whatever may be the case with regard to *latifolia* and *scandica*, I am led by my experience to think that Boswell's *eu-Aria* and *rupicola* are so connected by intermediates that for certain plants it is impossible to choose between the two names." This is certainly a puzzling plant. I agree with the Rev. A. Ley in thinking that it cannot be referred to *P. scandica*, and still less to *P. Mougeotii*, which name has, I believe, been given to it. The incisions between the lobes are deepest beyond the middle of the leaf, which is not the case in the three species already named, but I hesitate whether to call it *P. eu-Aria* or *P. rupicola*. The former has leaves quite as deeply lobed, but the number of veins, from seven to ten on each side, indicates its affinity with *P. rupicola*, if the latter be considered deserving of a name. Year by year I incline more to the belief that *P. rupicola* is *P. eu-Aria* growing in uncongenial conditions—poor soil, exposure to wind, or deficient heat.—J. T. BOSWELL.

Sedum Forsterianum Sm., var. *virescens*. — Occupying damp shady cliffs on both sides of the Rhaidr Falls bounding the counties Montgomery and Denbigh, four miles west of Llan-rhaidr, July, 1882. Quite green; larger in all its parts than the glaucous form of *S. Forsterianum*. This is the same plant as I have in other years sent to the Club from a precisely similar situation at Water-break-its-neck, Radnorshire; but I am in entire doubt whether it should be referred to this species or to *S. rupestre* Huds. It does not agree in size with the description of Mr. Borrer's specimens of the var. *virescens* of *S. Forsterianum* in Eng. Bot.; which are stated there to be "more slender than the var. *glaucescens*." —AUGUSTIN LEY. "I think there are two subspecies of *rupestre*, viz.:—1. *S. pruniatum* Brotero = *S. elegans* Lejeune. 2. *S. Forsterianum* Sm. = *S. aureum* Wirtg., and that this represents the latter excellently."—J. G. BAKER.

Hieracium corymbosum Fr. — Cliffs between St. Andrews and Kinkell Ness, N.E. Fife, 8th August, 1882.—CHARLES BAILEY. "I think that your *Hieracium* from the neighbourhood of St. Andrews is *H. corymbosum* Fries, though it differs a good deal from the type. The leaves are not so rhomboidal in yours, nor is the corymbous character 'typical.' The peduncles are larger than usual, and the

heads not nearly so much condensed. Still I think it is an 'erratic form' of that species. . . . . It is difficult to say, without very close observation, what change may be effected (in this changeable genus!) by locality and soil. Some broad-leaved forms of *H. crocatum* run so near to *H. corymbosum* at first sight that it is difficult to speak positively about a single specimen. From the long and scattered peduncles, and somewhat differing leaves in your plant, I can quite imagine that it *may* be a very luxuriant 'broad-leaved form' of *H. crocatum;* and yet I think that 'till further evidence' presents itself, it may be most prudently called '*corymbosum*.' Yet I fully agree with Prof. Babington's feeling of uncertainty."—J. Backhouse in litt. ad. Charles Bailey.

Lemna minor Linn. — Tankerness, Orkney, March, 1882; collected by W. Cowan. The only known station. Reported as occurring in "ditches," by Dr. Gilbert Maccrab, certainly a mistake; and marked "extremely doubtful" by Robert Heddle and Dr. Duguid in their MS. list. Possibly introduced.—W. Irvine Fortescue.

REPORT OF THE HERBARIUM OF THE ROYAL GARDENS, KEW, FOR 1882.*

By Sir J. D. Hooker, K.C.S.I., &c.

Principal Additions.—1. The collection of European and exotic lichens formed by the Rev. W. A. Leighton has been presented by that gentleman. It is contained in 500 cardboard portfolios, lettered on the back with the contents; as supplementing the collections of Withering, Turner, and Borrer, the fathers of British Lichenology, which are deposited at Kew, it has a special value. — 2. An interesting portion of the Herbarium formed by the late Mr. Wilson Saunders, F.R.S., has been transferred to Kew from the Oxford Botanical Gardens, to which it had been presented by his relatives. It contains 271 species of plants, for the most part figured in Mr. Wilson Saunders's 'Refugium Botanicum.'—3. The Botanical Record Club has presented to Kew its herbarium of British plants, containing 1340 species, and innumerable specimens illustrating the local floras of the British Islands.

The following is a list of the other principal contributors to the Herbarium during 1882:—

Europe. — Arnold, Dr. F.; Lichens (86). Brotherus, V. F.; Finland Mosses (100, purchased). Cooke, Dr. M. C.; British *Fungi* (32); sundry do. (20). Groves, H.; Italian plants (145). Henriques, Dr. J. A.; Portuguese plants (164). Hooker, Sir J. D.; Mosses, chiefly German (132). Husnot, T.; French Mosses (50). Kanitz, Dr. A.; European plants (285). Kunze, J.; *Fungi* (100, purchased). Lacaita, C. C.; Italian plants (18). Lange, Professor; Danish, &c., plants (68). Nicholson, G.; Roses, &c. (9). Nylander, Dr.; Lojka's Lichens (332, purchased). Oliver, D.; British plants,

* Issued March, 1884.

(4). Pasquale, Prof.; Italian cultivated plants (7). Reverchon, E.; Sardinian plants (247, purchased). Vize, Rev. J. E.; British *Fungi* (100, purchased). Wittrock, V., and Nordstedt, O.; Freshwater *Algæ* (100, purchased).

Asia and Indian Archipelago. — Aitchison, Surgeon-Major; Punjab, &c., plants (63). Alabaster, H.; Siamese plants collected by Mr. Murton (147). Beccari, Od.; Borneau plants (3). Beddome, Col.; Deccan plants (20). Bourne, F. S. A.; Chinese plants (6). Bretschneider, Dr. E.; Chinese plants (30). Bureau, Prof., Jardin des Plantes, Paris; Abbé David's Chinese plants (297). Bushell, Dr.; Chinese plants (3). Cantley, N.; Malayan plants (220). Carpenter, Lieut., H.M.S. Magpie; Orsima plants (15). Cooke, Dr. M. C.; Siberian, &c., *Fungi* (10). Duthie, J. F.; North Indian plants (302). Forbes, H. O.; Malayan plants (3). Ford, C.; Chinese plants (51). Hance, Dr.; Chinese plants (7). King, Dr. G.; Indian plants (23). Murray, J. A.; Kurrachee *Algæ* (16). Parish, Rev. C; Burmese plants (19). Phillips, G.; Chinese plants (3). Pierre, L.; Cambodian and Cochin China plants (709). Riedel, M.; Buru and Timor Laut plants (40). Suringar, Dr.; Malayan plants (14). Talbot, W. A.; Canara plants (219). Trimen, Dr. H.; Ceylon plants (19). Veitch, Messrs.; Indian, &c., plants (18). Wall, G.; Ceylon plants (50). Watt, Dr. G.; Munnipore plants (101). Watters, T.; Formosan plants (97).

Africa. — Blagrave, Lieut.-Col.; Cape plants (30). Burton, Capt., and Cameron, Comm.; Gold Coast plants (151). Drummond-Hay, Miss; North Morocco plants (13). Feilden, Capt. H. W.; Cape Lichens. Godefroy-Lebœuf; Soudan vine. Hart, H. C.; Sierra Leone plants (13). Kirk, Sir John; Zanzibar plants (3). McKenzie, Mrs.; Zululand plants (83). MacOwan, P.; South African plants (43). Moloney, Capt. A.; Gold Coast plants (12). Rumsey, Comm., R.N.; West African plants (15). Schweinfurth, Dr. F.; East African plants (11). Slade, Dr., H.M.S. Fawn; Red Sea plants (21). Soyaux, H.; Gaboon plants (350). Wood, J. M.; Natal plants (243).

Mauritius, Madagascar, &c. — Baron, Rev. R.; Madagascar plants (1137). Coppinger, Dr. R. W.; Amirante and Seychelles Islands plants (88). Horne, J.; Mauritius plants (11). Parker, Dr. G. W.; Madagascar plants (136).

North America. — Allen, Dr. F.; *Characeæ* (20). Cooke, Dr. M. C.; *Fungi* (54). Curtiss, A. H.; Floridan plants (243, purchased). Davenport, G. E.; Unalaska plants (14). Eaton, Prof. D. C.; Ferns (5). Ellis, J. B.; *Fungi* (900, purchased). Gray, Dr. A.; various (175). Haydon, Walter; Hudson's Bay plants (52). Lange, Prof. J.; Greenland plants (84). Lemmon, J. G.; California plants (12). Pringle, C. G.; Pacific States plants (124). Ravenel, H. W.; *Fungi* (200, purchased). Sargent, Prof. C. S. (198). Vasey, G.; California plants (589).

West Indies and Guiana. — Eggers, Baron; West Indian plants (199). Jenman, G. S.; Guiana plants (742). Prestoe, H.; Palms (3). Syme, G.; Jamaica plants (4). Taylor, Mary; Jamaica plants (22).

South America.—Coppinger, Dr. R. W.; Extra-tropical South American plants (188, exclusive of lower Cryptogams). Cranwell, W. B.; Monte Video, &c., plants (50). Glaziou, A.; Brazil plants (943). Gregory, H. K.; Brazil plants (18). Markham, C. R.; Cinchona (3). Reynell, —; Brazil plants (1288). Veitch, Messrs.; Cross's Chimborazo plants (47). Warming, Dr.; Brazil plants (4). White, R. B.; New Grenada plants (6).

Australia.—Coppinger, Dr. R. W.; Torres Straits, &c., plants (90). Lawson, Prof.; Tasmanian plants. Mueller, Sir F.; Australian plants (78). Schomburgk, Dr. R.; Australian plants (117).

New Zealand. — Cheeseman, T. F. (15). Green, Rev. W. S.; Mount Cooke plants (6). Hector, Dr. (92). Kirk, T. (25).

Polynesia. — Arundel, S. T.; plants from various islets (31). Comins, Rev. R. B.; Solomon bed plants (28). Coppinger, Dr. R. W.; various plants (26). Davenport, G. E.; Sandwich Islands plants (7). Gill, Rev. W. Wyatt; Samoan, &c., plants (10).

[A very useful 'List of Palms cultivated in the Royal Gardens' is appended to the Report.]

NOTICES OF BOOKS.

Acotyledoneæ Vasculares et Characeæ Europæ. Auct. C. F. Nyman. E Conspectus Floræ Europææ supplemento 1 seorsim impr. Orebro, 1883.

The arrangement of the *Characeæ* is for the most part in accordance with that adopted in Braun's 'Fragmente.' There are forty-one species enumerated, under the four genera *Chara*, *Lychnothamnus*, *Nitella* and *Tolypella*, the genus *Lamprothamnus* being included under *Lychnothamnus*. The records of the British species are, as a rule, very accurate; *Chara contraria* is, however, only noted from Surrey, and *C. canescens* from Falmouth, and *C. rudis* is not given for Scotland; but in a work dealing with so large a mass of material, some records must almost necessarily be overlooked. *Nitella syncarpa* is recorded from England, but we do not know upon what authority. The nomenclature shows some improvement on Braun's work, notably in the cases of *Chara vulgaris* and *C. Braunii*: it is very satisfactory to see the former name gradually resuming its proper place, instead of the more recent *C. fœtida*, for the introduction of which there does not appear to have been any sufficient reason. *C. ceratophylla* has been retained, the two earlier names, *C. tomentosa* L. and *C. latifolia* Willd., being quoted under it.

H. & J. G.

The Second Annual Report of the Felsted School Natural Science Society contains an excellent list of the flowering plants found within a four-mile radius from the school. It is mainly the work of two of the masters, the Revs. E. Gepp and F. H. Manley, and is a very useful contribution to our knowledge of the botany of Essex, of which Mr. G. S. Boulger is preparing a new flora.

British mycologists will be interested in knowing that the Rev. John Stevenson has in preparation a 'Flora of British Fungi' (*Hymenomycetes*), in two volumes, illustrated by M. W. G. Smith. The price to subscribers will be 10s. 6d. per volume, and the first will be published as soon as a sufficient number of names have been received by the author, whose address is Glamis, Forfarshire, N.B.—Mr. William Phillips is preparing a 'Manual of British Discomycetes,' in one volume, illustrated: price to subscribers not to exceed 10s. Address:—Canonbury, Shrewsbury.

The last part of Boissier's 'Flora Orientalis,' containing the Grasses, Gymnosperms and Vascular Cryptogams, appeared in April last, An 'Index Nominum Vernaculorum' is contributed by Prof. Ascherson. M. Boissier is now engaged upon a supplement to the whole work.

The ninth decade of Baron von Mueller's 'Eucalyptographia' has been issued. In addition to the usual figures of mostly little-known species, there is an intersting plate of Eucalyptus seedlings, showing that even in the cotyledonary leaves great specific diversities are apparent.

The Committee of the Palestine Exploration Fund has issued a handsome quarto volume of 455 pages, on 'The Fauna and Flora of Palestine,' under the editorship of Dr. Tristram. The Flora occupies about half the book; it consists of a list of species, mainly compiled from Boissier's 'Flora Orientalis,' but including other sources, of which Dr. Tristram says:—"The catalogue of the Flora has been compiled, both from my own herbarium, comprising 1,400 species, formed by Mr. B. T. Lowne, who accompanied me as botanist in my expedition of 1863–4, and from the various additions made by me in two subsequent journeys. The herbariums of the late W. Amherst Hayne, Esq., and of the Rev. H. E. Fox, and the Rev. W. Linton, have contributed several additions. The MS. catalogue of the Flora of Palestine, compiled by Mr. Hanbury and Sir Joseph Hooker, now in the Herbarium at Kew, has also been used." We regret to see that the objectionable innovation of spelling all specific names with a small initial letter has been adopted.

Dr. Croumbie Brown is continuing his series of works on Forestry with great rapidity: his last contribution is a general sketch of the subject entitled 'Introduction to the Study of Modern Forest Economy' (Edinburgh, Oliver & Boyd), which gives in a handy and readable form the views of the principal writers on the subject.

New Books.—C. Haussknecht, 'Monographie der Gattung Epilobium' (4to pp. viii. 318, tt. 23: Jena: Fischer).—J. Weisner, 'Elemente der Organographie, Systematik und Biologie der Pflanzen' (8vo, pp. xii. 449: Vienna: Holder).—H. F. von Bretfeld, 'Das Versuchswesen auf dem Gebiete der Pflanzenphysiologie' (8vo, pp. viii. 264: Berlin, Springer).—K. L. Vetters, 'Die Blattstiele der Cycadeen' (8vo, pp. 26, 2 plates: Leipzig).—A. Tschirch,

Untersuchungen über das Chlorophyll' (8vo. pp. 155, 3 plates: Berlin, Parey).—F. HAZLINSZKY, 'A Magyar Birodalom Zuzmó-Flórája' (Budapest: pp. viii. 304).—W. B. GROVE, 'A Synopsis of the Bacteria and Yeast Fungi' (8vo, pp. 112, illustrated: Chatto & Windus, 3*s.* 6*d.*). — J. C. BROWN, 'Modern Forest Economy' (8vo, pp. viii. 228: Edinburgh, Oliver & Boyd).

ARTICLES IN JOURNALS.

American Naturalist.—E. L. Sturtevant, 'Agricultural Botany.'—D. H. Campbell, 'Fertilization of germ cell of *Equisetum arvense*.'

Botanical Gazette.—W. Boott, 'Notes on Cyperaceæ' (*Rhynchospora Harveyi*, *Carex prægracilis*, *C. Assiniboinensis*, *C. Lemmoni*, spp. nn.). — J. Schneck, 'Notes on *Phoradendron flavescens*.' — G. Vasey, 'Notes on *Eriochloa*.'

Bot. Centralblatt (Nos. 23, 25).—H. Christ, 'Allgemeine Ergebnisse aus der systematischen Arbeit am genus *Rosa*.'—(No. 23). K. Goebel, 'Ueber die Sporophylle von *Osmunda*.'

Botanische Zeitung (May 23). — E. Strasburger, 'Zur Entwickelungsgeschichte der Sporangien von *Trichia fallax*.'—T. Bail, 'Ergänzung u. Berichtigung zu Brefeld's Behandlung der Gährungsfrage.' — (May 30 & June 6). H. de Vries, 'Ueber die periodische Saürebildung der Fettpflanzen.'—(June 13). C. Weber, 'Ueber den Pilz der Wurzelauschwellungen von *Juncus bufonius*.'—(June 20). R. Göthe, 'Zum Krebs der Apfelbaüme' (1 plate).—(June 27). A. Koch, 'Ueber den Verlauf und die Endigungen der Siebröheren in den Blättern.'

Bull. Bot. Soc. France (xxxi.: Comptes rendus, No. 3).—P. van Tieghem, 'Sur les faisceaux libéro-ligneux corticaux des Viciées.'—Id., 'Sur la disposition des canaux sécréteurs dans les Clusiacées, les Hypericacées, les Terustroemiacées et les Diptérocarpées.'—W. Barbey, 'Pena de Aiscorri.'—P. Hariot, 'Plantes vasculaires observées dans le détroit de Magellan et à la Terre de Feu' (*Schœnus sodalium*, sp. n.).—P. van Tieghem & L. Morot, 'L'anatomie des Stylidées.'—C. Flahault, 'Notice biographique sur M. Duval-Jouve' (1810–1883).—(No. 4). A. Le Grand, 'Notice sur quelques plantes critiques' (*Hieracium Legrandianum* Arvet-Touvet, sp, n.). — D. Clos, 'Tribus, Sous familles, Familles unissantes.' — E. Grimier, 'La régéneration naturelle des Futaies.'—M. Bondier, 'L'Apparition precoce des Morilles en 1884.'—A. Cagnieul, 'La division du noyau cellulaire dans les Characées.'—E. Mer, 'Récherches sur les mouvements nyctitropiques des feuilles.'

Bulletin of Torrey Bot. Club (May).—C. H. Peck, 'New Fungi.' T. Meehan, 'Bees and coloured flowers.'—Id., 'Survival of the Fittest.'—E. P. Bicknell, '*Carex pennsylvanica* and *C. varia*.'

Flora (May 21, June 1, 21).—P. Blenk, 'Ueber die durchsichtingen Punkte in den Blattern.'—J. Muller, 'Lichenologische Beiträge.'—(June 11). F. Arnold, 'Die Lichenen des fränkischen Jura.'

Garden.—May 31. *Ismene Andreana* (ic. pict.).—(June 14). *Stenorhynchus speciosus* (ic. pict.).

Gardeners' Chronicle (May 31).—*Hymenocallis eucharidifolia* Baker n. sp. — (June 7). *Masdevallia racemosa* var. *Crossi* (fig. 139).—Cone of *Pinus Laricio* var. *Heldreichii* (fig. 140). — (June 14). C. B. Plowright, 'Wheat Mildew and the Barberry.' — *Fritillaria macrophylla* (fig. 145). — J. G. Baker, 'Notes on Peonies.' — (June 21). *Streptosolen Jamesoni* (fig. 147).—(June 28). *Coelogyne Dayana* Rchb. f., n. sp. — W. G. Smith, 'Disease of Yew (*Sphærella Taxi*)' (fig. 152).

Grevillea. — M. C. Cooke, 'New British Fungi' (*Agaricus ischnostylus*, *Oidium pactolinum*, spp. nn.). — Id., 'Notes on *Hypocreaceæ*.'—Id., 'Synopsis Pyrenomycetum.'—Two plates of *Xylaria*.

Journal of Royal Microscopical Society.—J. Badcock, 'On certain filaments observed in *Surirella bifrons*.'

Midland Naturalist.—W. B. Grove, 'On the Pilobolidæ' (1 plate). —J. E. Bagnall, 'Flora of Warwickshire' (*Polygonaceæ—Ceratophylleæ*).

Oesterr. Bot. Zeitschrift. — J. Velenovsky, 'Böhmische Rosen.' —E. Formánek, 'Flora der Beskiden.' — Celakovsky, '*Polygala supina* & *P. andrachnoides*.' — B. Blocki, 'Flora von Galizien.' — M. Kronfeld, 'Pflanzennamen aus der Wiener gegend.' — J. A. Baümler, 'Mykologisches aus Pressburg.'

Pharmaceutical Journal.—(May 31). W. T. T. Dyer, 'Further notes on Waras' (*Flemingia Grahamiana*). — (June 7). W. Dymock, 'Essential Oils of *Blumea lacera* and *Sphæranthus indicus*.'

Proc. Linn. Soc. N. S. Wales (viii., pt. 4 : Feb.).—E. Haviland, Notes on *Myrsine variabilis*.

LINNEAN SOCIETY OF LONDON.

April 17, 1884. — Alfred W. Bennett, M.A., in the chair. — Messrs. Benjamin Lomax and R. Lloyd Patterson were elected Fellows of the Society.—Dr. J. Poland exhibited under the microscope a series of preparations, stained by reagents, illustrating the *Bacillus* of Anthrax from man. He remarked that the *Bacillus*-spores in many instances doubtless were conveyed in the dried skins and hides imported from abroad, and that these spores under favourable circumstances inoculated those handling the dried hides, &c.. the germs afterwards developing in the usual manner of such low vegetable organisms in the human body, and setting up the severely fatal malady in question. — A paper was read by the Rev. J. M. Crombie, "On the Algo-lichen-fungal Hypothesis." The author gave a brief sketch of the hypothesis enunciated by Schwendener, Bornet, and others, noticing the various arguments and illustrations which had been adduced in its support. He then discussed the result which had been obtained from experiments in lichen-cultures, whether from the spore or by synthesis, observing that in both cases these were confessedly but small, owing to the very great difficulty of cultivating beyond a rudimentary stage,

except under the same atmospherical conditions in which they grow in nature. Two fatal objections, he said, might be taken to the theory: (1) the one having reference to the very peculiar nature of the parasitism it assumes; and the other (2) to the fact that, notwithstanding a similarity of appearance, there were in reality no true fungal-mycelia nor true algal-colonies in lichens. As to any direct genetic or any indirect parasitical connection between the gonidia of lichens and the hyphal filaments, it was further pointed out that none such existed, but that on tracing the evolution of the thallus from the germinating spore it is seen that the gonidia originate in the cellules of the first parenchymatous tissue formed upon the hypothiallus; and that subsequently, through the resorption of the lower portion of the cortical structure, they became free, and constituted the thin gonidial stratum. Where seen lying amongst the medullary they are often attached to these, not as the result of any copulation, but by means of the lichenin which permeates the whole thallus. The origin of the gonidia and their relation to the rest of the lichen thallus, the author stated in conclusion, thus belonged to the very elements of morphological Botany. — There followed a note on a remarkable variation in the leaf of *Banksia marginata*, observed by Mr. J. G. Otto Tepper near Adelaide, South Australia. He describes the plant, and then questions whether it might not be regarded as a spontaneous production of a new variety or species, or whether it might not be the remnant or representative of an extinct form.—Mr. R. A. Rolfe then described and made some observations on *Hyalocalyx*, a new genus of *Turneraceæ* from Madagascar. According to Dr. J. Urban (the latest authority) the order consists of five genera and eighty-three species, distributed in America from N. Carolina and Mexico to the Argentine Republic, and in Africa from Abyssinia to Mozambique and the Cape of Good Hope; while outliers are found in the island of Zanzibar and Rodriguez. The plant now added to the order was obtained by Dr. C. Rutenberg on Nossi-bé, a small island on the N.W. of Madagascar. Its peculiarities incline Mr. Rolfe to recognise in it the type of a new genus, as above named, with a position between *Mathurina* and *Turnera;* its most remarkable character being its glassy transparent calyx, which is totally destitute of chlorophyll or other colouring matter.

May 1. — Prof. P. Martin Duncan, F.R.S., Vice-President, in the chair.—Messrs. W. Dennison Roebuck and F. Newton Williams were elected ordinary Fellows, and Professors E. Haeckel, of Jena, A. Kowalevsky, of Odessa, and S. Schwendener, of Berlin, Foreign Members of the Society. — Mr. R. A. Rolfe read a paper, "On the Flora of the Philippine Islands, and its probable derivation." After a general survey of the islands in their geographical relations, and incidental reference for comparisons to Alfred Wallace's, Lord Walden's, and others researches on the fauna of the islands, the author gives a brief epitome of the botanical literature on the Philippines. He refers to Ray's Appendix, Hist. Plant. iii., the material therein being furnished by Father Camell, and still extant in the Sloane Collection, Brit. Mus., though hitherto ignored by

botanists. Nees's collections described by Cavanilles in his 'Icones'; and Blanco's 'Flora de Filipinas,' and later edition by Father Villar are specially noted; as likewise Presl's 'Reliquiæ Haenkeanæ,' the collections of H. Cuming, the 'Plantæ Meyenianæ,' Father Llanos's 'Fragmentos de Algunas Plantas de Filipinas,' besides other monographs scattered through various publications. Mr. Rolfe, however, expresses himself particularly indebted to Cuming's collections, and to the very valuable help and incentive derived from Don Sebastian Vidal y Soler, Conservator of the Forests in the Philippines, who, when lately working at Kew on the continuation of his 'Sinopsis de Familias y Generos de Plantas,' had induced him to study the flora in question from its distributional aspect. So far as is at present known, it may be computed that the whole phænogamic vegetation of the Philippines consists of 3564 species belonging to 1002 genera. Of 165 dicotyledonous orders 119 are represented, and of monocotyledons 25 out of 35; while all three *Gymnospermeæ*, though present, are but poorly represented. The proportion of Vascular Cryptogams to Phenogams is nearly one-eighth, chiefly Ferns. Of these latter, fifty-two are not known elsewhere, a fact in itself stamping an individuality on the islands. The endemic phenogamic vegetation consists of 917 species, or a proportion of over one-fourth endemic, the Dicotyledons showing a proportion of over one-third endemic, and the Monocotyledons of a little over one-tenth, chiefly Orchids. These figures may hereafter require emendation as further researches come to light, but meanwhile the striking feature of the flora is the large number of endemic species and the very small number of endemic genera, a fact accentuated on study and comparison with the data of the flora peculiar to the neighbouring islands of Borneo, Sumatra, &c. The flora on the whole approximates most to that of the Malayan region; moreover, there is still this to be said—that a large number of typical Malayan genera have not yet been detected in the Philippines, though many of these occur on the neighbouring island of Borneo. Mr. Wallace attributed a like distribution of the genera of animals to extinction by submergence, though Mr. Rolfe inclines to think that plant and animal migration has not extended so far in this direction. Mr. Rolfe avers that the great number of Malayan types extant with the proportion of the endemic species, as well as a considerable boreal and Australian element, seem to point out that submergence alone will not account for the present peculiarities of distribution. A dominant feature in the flora is undoubtedly the Australian and Austro-Malayan element. Without here giving the details of his reasoning, Mr. Rolfe's conclusions may be summed up as showing:—that the Philippines are truly insular in the essentials of their natural history. This not so much through their being an early separation of the Asiatic Continent, which has had a dip under the sea, as from their being largely of volcanic, and geologically of somewhat recent origin—to wit, as is presumed to be the case of other islands of admitted oceanic origin. Mr. Rolfe describes several new species, and a new genus of *Rubiaceæ*, *Villaria*.

MARSUPELLA SPARSIFOLIA (Lindb.).

By W. H. Pearson.

(Plate 248).

Jungermania Funckii Auct. p. p.

Sarcoscyphus Funckii, a. *major*, Nees Nat. Eur. Leb. i. p. 135, No. 5 (p. p.?), 1833. G. L. N. Syn. Hep. p. 9 (p. p.?), 1844.

Sarcoscyphus sparsifolia Lindb. in Not. pro F. Fl. fenn. Förh. 1, p. 280, No. 13 (1868). Hartm. Skand. Fl. x. ed. ii. p. 129, No. 3 (1871). Lindb. in Not. pro F. Fl. fenn. Förh. (1874). Limpr. Jahr.-Ber. Schl. Ges. p. 180 (1881).

Nardia (*Marsupella*) *sparsifolia* Lindb. in Not. pro F. Fl. fenn. Förh. xiii. p. 370 (1874).

Marsupella sparsifolia Dum. Hep. Eur. p. 128 (1874).

Nardia sparsifolia Lindb. Musci Scand. No. 158, p. 9 (1879), not Mass. ed Carest. Ep. Alp. Penn. Nuo. Gior. Bot. Ital. xii. No. 4, p. 313 (1880). See Nuo. Gior. Bot. Ital. xiv. No. 3, p. 221 (1882).

Nardia adusta, var. b. *sparsifolia*, Lond. Catal. p. 27 (1881).

Sarcoscyphus sparsifolia, var. *noricus*, Limpr. Jahr.-Ber. Schl. Ges. p. 180 (1881).

Delin. Mass. ed Carest. Ep. Alp. Penn. Nuo. Gior. Bot. Ital. tab. xii. fig. 1 (1882).

Exsicc. Lindb. et Läcks. Hep. Scand. Ex. No. 21.

Hab. On rocks in alpine and subalpine situations, Loch-na-gar, Aberdeen, J. & T. Sim, 14th August, 1876. Distributed by Mr. Sim as *M. emarginata*, small form; detected by Dr. Carrington, and inserted in 'London Catalogue,' p. 21 (1881), but placed in Province 16 in error: should be 15. Found on the Continent in Norway, Sweden, Lapland, Austria, and Switzerland.

Measurements. Stems ½ to 1 inch long, diam. ·16 mm. × ·13 mm.; leaves ·8 mm. × ·8 mm., sinus ·25 mm. deep, ·85 mm. × ·65 mm., sinus ·25 mm. deep; subinvolucral leaves 1·2 mm. × 1·1 mm., sinus ·4 mm. deep; involucral leaves 1·6 mm. × 1·1 mm., sinus ·5 mm. deep, 1·5 mm. × 1·3 mm., 1·4 mm. × 1.1 mm.; perigonial leaves ·9 mm. × ·9 mm., sinus ·2 mm. deep; colesule 1·2 mm. high from base of involucre; segments ·4 mm.; leaf-cells ·02 mm. × ·03 mm., ·02 mm. × ·02 mm.; cells of stem, exterior layer ·02 mm. × ·025 mm., interior ·015 mm. × ·015 mm.

Tufts of an olive or blackish brown colour, sublævigate, not polished; stems creeping, intricately entangled; stoloniferous stolons without or with a few leaves; shoots simple or rarely irregularly furcate, annotinous, often one, two, or three innovations on single stem, erect, often frontally compressed, cross-sections ovate to ovate-orbiculate.

Rootlets short, purple, mostly on the under side of the creeping stems and stolons, rarer on the erect shoots.

Leaves about twelve to twenty pairs, distichous or subsecund, alternate, clasping stem at the decurrent base, ascending; lower leaves approximate, vaginate, somewhat distant; the few leaves

nearest apex more closely imbricating, roundîsh-ovate, cordate-orbiculate, obcordate, subquadrate; some leaves contracted at base, emarginate, sinus one-fourth to one-third deep, obtusely angular, wide, rarely acute; segments broad, obtuse, rarely acute, divergent in the lower leaves; posterior lobe rather larger than the other. *Colour* dark olive-brown, sphacelate, not polished, scarcely altered when dry.

Inflorescence terminal-paroicous.

Perigonial leaves two or three, sometimes four to five pairs below the involucre, broadly orbiculate, ventricose at the base.

Involucre composed of two larger leaves, ovate, subquadrate, sinus and segments acute, about one-fourth the length of the leaf.

Colesule of much more delicate cell-structure, with distinct trigones, adnate with the lower third of the involucre, divided for half its length into five irregular denticulate segments; terminal cells elongate, hyaline.

Antheridia oval, stipitate, two in each leaf.

Archegonia eight, surrounding base of calyptra.

Calyptra oval, with delicate and irregular reticulation.

Cells smallish, roundish, 4–5 and 6-sided, with thick walls, which are reddish brown through transmitted light; trigones only very distinct (unless a little sulphuric acid is added) in the cells of the involucre and colesule.

To Gustav Limpricht (Jahr.-Ber. Schl. Ges. 1881) I am indebted for the following particulars:—"In the original specimens of *M. sparsifolia* the capsules are small, ·50 mm. diam., dark brown, almost sphærical, the pedicel ·21 mm. diam., with fifteen peripherical cells, which are twice as large as the inner ones, the walls of the capsule consisting of two equal layers."

In addition to our Scottish specimens and very fine ones collected on the Grimsel by Geo. Davies, Esq., I have had the opportunity of examining a series of specimens distributed by Prof. Lindberg, and find that the sinus and segments of the leaves are usually somewhat obtusely angular and much more rarely acute, which characters hardly agree with the description given by the founder; see translation in Carrington's 'British Hepaticæ':—"acutely emarginate, lobes rather acute."

When once the inflorescence is determined, there can be but little difficulty in distinguishing this species from any of the others belonging to this genus; in habit and general appearance it resembles small forms of *Marsupella sphacelata*, but which, however, is dioicous; from one of the smaller forms of *Marsupella adusta*, which Dr. Spruce has named *Marsupella ustulata*, it is distinguished by its size, robustness, and more obtuse lobes.

Marsupella gracilis (Mass.), first confounded by its proposer with *M. sparsifolia*, is a small, somewhat rigid form belonging to the *M. adusta* group, having acute, sometimes apiculate segments.

Dr. Carrington adds the following note:—"The leaves of *M. sparsifolia* resemble those of *Jung. inflata* in form and colour; indeed *M. sparsifolia* might easily be overlooked as a small form of that species. The dioicous inflorescence and colesule should render the diagnosis easy.

DESCRIPTION OF PLATE 248.—1. Portion of stem, Loch-na-gar, J. & T. Sim, × 24. 2. Stem, Karel Ladogensis, Norrlin, S. O. L., × 24. 3. Perigonial leaf, Lago Lucendro, G. Davies, × 31. 4, 6, & 7. Stem-leavəs, Loch-na-gar, J. & T. Sim, × 31. 5. Subinvolucral leaf, Karel Ladogensis, Norrlin, S. O. L., × 31. 8. Involucre, with portion of colesule, Karel Ladogensis, Norrlin, S. O. L., × 31. 9, 10, & 11. Stem-leaves, Lago Lucendro, G. Davies, × 31. 12 & 13. Involucral leaves, Loch-na-gar, J. & T. Sim, × 16.

SOME CHINESE *CORYLACEÆ*.

BY HENRY F. HANCE, Ph.D., F.L.S., &c.

IN a lecture delivered before the Royal Geographical Society in 1878, Mr. Thiselton Dyer remarked, "I know of no field for botanical exploration where amateurs could at the present time collect with less trouble and with more probability of rendering useful aid to science than in China." And certainly the discovery within a short period of no less than nine members of the fine family of *Corylaceæ*, diagnoses of which the writer has the pleasure to append, affords an astonishing proof of the extreme richness of the South Chinese Flora. In drawing up the characters the author has followed as closely as possible the method adopted in his 'Analecta Dryographica,'* published eight years ago, always taking account of the angle of divergence of the costules. Out of respect to the judgment of Mr. Bentham the genus *Castanopsis* has been retained, though very much *à contre-cœur*, the writer being still of opinion that both it and *Castanea* should be united with *Quercus*.

534 **1. Quercus** (PASANIA) **Naiadarum,** sp. nov.—Ramulis angulatis glaberrimis purpureis, foliis coriaceis lineari-lanceolatis integerrimis basi sensim angustatis apice acutis glaberrimis lucidulis costa subtus elevata costulis numerosis tenuibus reteque venularum subtili utrinque elevatis 4 poll. longis 7–10 lin. latis petiolo vix conspicuo, spicis masculis paniculatis rachi floribusque canotomentosis, bracteolis ovatis longe setaceo-acuminatis ferrugineotomentosis, fructibus secus pedunculum crassum folio circiter æquilongum ternis parum dissitis, cupulæ patelliformis squamis adpressis late ovatis acuminatis tomentellis 5-seriatis, glande ovoideo-globosa castanea lucida 7 lin. diametro.

Copiose secus rivulos, necnon in sabulosis alveorum, ad radices montium in territorio indigenarum Lai dictorum ins. Hai-nan, d. 26 Nov. 1882, leg. rev. B. C. Henry. (Herb. propr. n. 22199.)

A pretty species with willow-like leaves, which the writer would station in the neighbourhood of *Q. Hancei* Benth. and *Q. thalassica* Hance.

2. Quercus (PASANIA) **uvariifolia,** sp. nov.—Ramulis teretibus dense rufulo-velutinis, foliis coriaceis ellipticis integerrimis v. apicem versus parce repandulo-serratis basi obtusis apice subito breviter acuminatis supra præter costam planam tomentosam glabris subtus fulvo-tomentosis costa costulisque ad utrumque latus circ. 25 sub angulo 35° egressis prominulis apice curvulis trabeculis

* Journ. Bot. 1875, 361.

numerosis elevatis connexis 5–7 poll. longis $2\frac{1}{4}$–3 poll. latis petiolo fulvo-tomentoso pollicari, stipulis oblongis scariosis ferrugineo-tomentosis 6 lin. longis, spicis androgynis densissimis basi squamis oblongis scariosis ferrugineis fultis circiter $2\frac{1}{2}$ poll. longis, floribus imis femineis reliquis masculis, stigmatibus teretibus divergentibus nigricantibus nitidis, fructibus pollicem latis, cupulæ hemisphæricæ squamis crassis lanceolatis dorso gibbosis atro-cinereis apice inflexis, glande omnino immersa vertice convexiuscula fulvento-tomentella.

Ad ripas fl. Sui-kong, brachii australioris fl. North River, in prov. Kwang-si, 130 m. p. a Cantone, occasum versus, m. Aprili 1883, florentem; in collinis ad radices montis Tan-ha-shan, circ. 300 m. p. a metropoli septentrionem versus, fructiferam invenit rev. B. C. Henry; in jugo Lo-fau-shan, m. Sept. 1883, fructiferam collegit C. Ford. (Herb. propr. n. 22206.)

This magnificent species is undoubtedly most closely allied to *Q. cornea* Lour., from which it differs much in foliage and indumentum, but resembles a good deal in fruit. This the writer has not been able to examine internally, so as to give the result of a closer comparison. The acorns are largely collected and sold for food.

Fully sensible of the great weight attaching to the opinion of Dr. Engelmann, who has so thoroughly studied the North American Oaks,* the writer yet ventures to express his conviction that Oersted† and Bentham‡ are right in placing *Q. densiflora* Hook. & Arn.! in *Pasania*, rather than in maintaining for it a distinct section, *Androgyne*, founded by Alph. DeCandolle, and adopted by Dr. Engelmann.

☞ 3. **Quercus** (Pasania) **litseifolia,** sp. nov.—Ramulis angulatis glaberrimis purpurascentibus, foliis membranaceo-coriaceis elliptico-lanceolatis integerrimis basi sensim cuneatis apice caudato-acuminatis glaberrimis supra nitidis subtus subopacis costa costulisque tenuibus ad utrumque latus circ. 8 sub angulo 60° egressis subtus tantum prominulis 5–$5\frac{1}{2}$ poll. longis 20–22 lin. latis petiolo 8–9 lineali, fructibus secus pedunculum crassum folio breviorem ternis basi coalitis, cupulis anguste patelliformibus 5 lin. diametro squamis parvis circ. 4-seriatis anulatim coalitis ferrugineo-tomentosis nigro-apiculatis, glandibus glaberrimis depresso-globosis castaneis 5 lin. altis hilo profunde exsculpto pallide rugosulo.

In jurisdictione Hung-mo, territorii indigenarum Lai dictorum, ins. Hai-nan, d. 22 Nov. 1882, leg rev. B. C. Henry. (Herb. propr. n. 22209.)

Near the Penang *Q. Wallichiana* Lindl.§

☞ 4. **Quercus** (Pasania) **synbalanos,** sp. nov.—Ramulis angulatis glaberrimis nigricantibus, foliis coriaceis ellipticis integerrimis

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* Trans. Acad. Sc. St. Louis, iii. 372, sqq; Watson, Bot. California, ii. 93.

† Liebmann, Chênes de l'Amér. trop. 14; Recherches s. l. class. d.Chênes, 75.

‡ Benth. & Hook. f. Gen. plant. iii. 408.

§ A diagnosis of this species, confounded by A. DeCandolle with the very different *Q. lamellosa* Sm., was given, and its position in the genus indicated, in Journ. Bot. 1870, 4, and 1874, 241.

basi cuneatis apice breviter cuspidato-acuminatis glaberrimis utrinque subopacis subtus glaucescentibus nervatione supra parum conspicua costa costulisque tenuibus ad utrumque latus circ. 8 sub angulo 45° egressis subtus prominulis 3½ poll. longis 20 lin. latis petiolo 7–8-lineali, spicis femineis folio longioribus rachi tenui angulata tomentella, floribus ternis dissitis arcte coalitis, squamis circ. 3-seriatis oblongis tomentellis, stylis 3 liberis divergentibus.

In silva Wong-nei-chung, ins. Hongkong, d. 30 Julii 1880, leg. cl. C. Ford. (Herb. propr. n. 22160.)

Perhaps near *Q. spicata* Sm., perhaps allied rather to *Q. fenestrata* Roxb., but this cannot be settled without ripe fruit.

The writer takes this opportunity of stating that the nearest ally of the Cambodian *Q. farinulenta* Hance!, which he had stationed next *Q. thalassica* Hance!,* is unquestionably *Q. rotundata* Bl.!

5. **Quercus** (Pasania) **iteaphylla,** sp. nov. — Ramulis angulatis nigricantibus glaberrimis, foliis coriaceis lanceolatis integerrimis basi sensim angustatis apice caudato-acuminatis glaberrimis utrinque lucidulis nervatione supra vix conspicua subtus subtiliter elevato-reticulatis costulis tenuissimis ad utrumque latus 12–14 sub angulo 45° egressis apice curvulis 2½–3½ poll. longis 9–15 lin. latis petiolo 3-lineali, amentis masculis simplicibus folio brevioribus densiusculis rachi floribusque cano-tomentosis, spicis femineis floribus solitariis dissitis cum rachi cano-tomentosis, stylis 3 cylindricis liberis divergentibus, cupulæ nascentis squamis circ. 3-seriatis oblongis.

In silvis vallis Wong-nei-chung, ins. Hongkong, Apr. 1881, Maio 1882, leg. C. Ford. (Herb. propr. n. 21805.)

In the absence of fruit the precise affinities of this species are not determinable, but it is probably near the last.

6. **Quercus** (Cyclobalanus) **silvicolarum,** sp. nov.—Foliis?, fructibus secus pedunculum validum approximatis, cupulis cupuliformibus 10 lin. diametro squamis brunneis tomentellis in lamellas 6 indistinctas denticulatas connatis, glandibus hemisphæricis rotundatis pallide castaneis glabratis nitidis 5-locularibus 6 lin. altis, stylis brevissimis connatis.

In territorio indigenarum Lai, ins. Hai-nan, d. 16 Nov. 1882, leg. rev. B. C. Henry. (Herb. propr. n. 22215.)

Though the foliage of this oak is unknown, the writer yet ventures to name and describe it from the fruit alone, as there can be, he thinks, no doubt that it is new. It is allied to the Sumatran *Q. omalokos* Korth.! and the Philippine *Q. Woodii* Hance!, but differs from both by the much smaller acorns, and the more cupuliform cups, with a larger number of concentric rings.

7. *Quercus Fyrei* Benth. — This remarkably elegant species, which the late Colonel Champion by some mistake declared to be abundant in the Wong-nei-chung woods, Hongkong, had never been met with there since he gathered it about thirty-five years ago, until Mr. Ford found it in flower in June, 1879, and again with young fruit in July, 1881, and in the autumn of 1882. Mr.

* Journ. Bot. 1875, p. 366.

Bentham was quite right in his surmise that it belongs to the section *Chlamydobalanus*, in which, though extremely well distinguished from all its allies, it stands nearest *Q. cuspidata* Sieb. & Zucc.! The original description* is so incomplete that it seems desirable to draw up a fresh diagnosis from the specimens at hand. Mr. Bentham describes the male aments as arranged in a terminal panicle, but this is most likely owing to the falling-off of the leaves.

Ramulis sulcato-angulatis glaberrimis lutescenti-brunneis, foliis coriaceis e basi cuneata lanceolatis sensim longe cuspidato-acuminatis integerrimis supra lucidis costa tenui vix prominula nervatione indistincta subtus plus minus dense cano-lepidotis v. imo glabratis costa costulisque tenuissimis ad utrumque latus circ. 8 sub angulo 50° egressis haud elevatis 3–4 poll. longis 11–15 lin. latis petiolo tenui pollicari, amentis masculis in axillis foliorum superiorum solitariis binisve ad 1½ pollicem longis simplicibus rachi tomentosa floribus densiusculis, spicis femineis 2½ pollicaribus rachi tomentella floribus dissitis, stylis cylindricis liberis, fructibus (immaturis) ovoideis circ. 7 lin. longis, cupulæ cano-tomentosæ totam glandem obvolventis squamis parvis adpressis circ. 10-seriatis.

540 8. **Castanopsis** (Eucastanopsis) **Fordii,** sp. nov. — Ramulis densissime fulvo-hirsutis, foliis coriaceis oblongo-lanceolatis integerrimis basi obtusis apice acutis calloso-mucronatis supra glaberrimis lucidis costa impressa nervis inconspicuis subtus dense fulventi-hirsutis costa costulisque ad utrumque latus circ. 15 sub angulo 40° egressis prominulis apice curvulis trabeculis numerosis tenuibus elevatis connexis 4 poll. longis 13–14 lin. latis petiolo brevissimo, fructibus dense aggregatis globosis ¾ poll. diametro aculeis 3 lin. longis a trunco communi divergentibus acutissimis sericeïs echinatis.

In jugo Lo-fau-shan, prov. Cantonensis, m. Sept. 1883, leg. cl. C. Ford. (Herb. propr. n. 22244.)

An extremely handsome species, nearest in affinity to *C. concinna* A. DC.

541 9. **Castanopsis** (Eucastanopsis) **Fabri,** sp. nov. — Ramulis angulatis glaberrimis atro-cinereis, foliis coriaceis lanceolatis basi cuneatis apicem versus anguste et remote pauciserratis in acumen falcatum productis supra glaberrimis lucidis costa impressa nervis inconspicuis subtus ochraceo-sublepidotis costa prominente costulis tenuibus ad utrumque latus circ. 10 sub angulo 60° egressis curvulis venulis inconspicuis 5½–7 poll. longis 18–22 lin. latis petiolo glaberrimo 5–6 lin. longo, fructibus subopacis globosis ¾ poll. diametro ferrugineo-tomentosis aculeis 2 lin. longis a trunco communi divergentibus acutissimis sericeis sæpe intervallis inermibus separatis echinatis 3–4-valvibus 3-spermis, nuculis castaneis lucidis.

In jugo Lo-fau-shan, prov. Cantonensis, m. Sept. 1883, leg. rev. E. Faber. (Herb. propr. n. 22219.)

Nearest *C. tribuloides* A. DC.

542 10. **Castanopsis** (Eucastanopsis) **jucunda,** sp. nov.—Ramulis angulatis glaberrimis nigricantibus, foliis rigide coriaceis ovato-

* Hook. Kew Journ. Bot. vi. 114; Fl. Hongkong. 321.

lanceolatis basi rotundatis apice acuminatis calloso-mucronatis a medio ad apicem parce repandulo-serratis supra glaberrimis luciduli olivaceo-viridibus nervatione inconspicua subtus dense cano-furfuraceo-lepidotis plus minus cinnamomeo-tinctis costulis ad utrumque latus circ. 8 tenuibus sub angulo 40° egressis curvulis elevatis trabeculis tenuissimis paulo conspicuis $2\frac{1}{2}$–$3\frac{1}{2}$ poll. longis 14–16 lin. latis petiolo 5-lineali glaberrimo, fructibus satis confertis glabris circ. 8 lin. diametro ferrugineo-tomentosis aculeis 2–$2\frac{1}{2}$ lin. longis a trunco communi divergentibus acutissimis sericeis echinatis, nuculis solitariis tomento derasili tectis.

In monte Tan-ha-shan, prov. Cantonensis, circ. 300 m. p. a metropoli septentrionem versus, m. Novembri 1883, leg. rev. B. C. Henry. (Herb. propr. n. 22232.)

Allied to *C. tribuloides* A. DC. and *C. chinensis* Hance. The foliage is not unlike that of *Quercus* (*Chlamydobalanus*) *sclerophylla* Lindl.

It may be interesting to transcribe Mr. Henry's note on the singular locality in which he discovered this remarkably handsome tree:—"On the side of Tan-ha-shan, beside the road leading up the steep hill to the celebrated Buddhist monastery of Tan-ha-tsz. The tree was a fine spreading one, probably fifty feet high, covered with abundance of fruit, which the people told me is gathered in quantities and sold for food. Tan-ha-shan is about thirty miles N.E. of Shui-kwan, on the banks of the Kam-kong, otherwise known as the Yan-fa stream, a tributary of the North River, and is about three hundred miles north of Canton. The hill is pure red sandstone, and is the most remarkable in one of the most remarkable groups of hills I have ever seen. It rises like a wedge, almost perpendicular on the long sides, to a height of 1500 feet, the only way of ascent being one of the narrow ends, on which this fine tree is found, and is about a mile long and perhaps one-third of a mile wide, being wider in places at the top than at the bottom. The top is covered with trees and plants, but, as the ascent is made up the bare face of the rock by shallow steps and an uncertain chain over a sheer precipice more than a thousand feet high, I did not go up. Within a radius of several miles are more than a hundred striking peaks of all shapes, and covered with vegetation; and among them the little stream winds. The vegetation is most profuse, and the soil and rock is all sandstone."

The writer has not been able to examine the cotyledonar structure of either of the above three species.

A NEW CHINESE *GOMPHOSTEMMA*.

By H. F. Hance, Ph.D., &c.

Gomphostemma insuave, sp. nov. — Caule erecto appresse tomentoso, foliis late ovatis basi cuneatis apice acuminatis grosse serrato-crenatis supra pilosulis subtus pallidis tomentellis guttulisque glandulosis consitis penninerviis nervis subtus paulo elevatis

ad 2 poll. longis latisque petiolo 1¼-pollicari, cymis uniparibus evolutis laxe plurifloris in paniculas caulem ramulosque terminantes dispositis, bracteis foliis conformibus sed parvis, bracteolis setaceis, inflorescentia rachibus glanduloso-villosulis, floribus 6 lin. longis, calycibus campanulatis glanduloso-tomentosis obscure 10-nerviis dentibus lanceolatis, corollis calyce 4–5-plo longioribus tomentellis tubo exserto flavis galea purpurea labii inferioris lobo medio lineari, genitalibus exsertis glaberrimis, nuculis glabris tenuissime rugosulis.

Prope Ying-tak, ad fl. North River, prov. Cantonensis, 200 m. p. a metropoli, substrato calcareo, m. Nov. 1883, leg. rev. B. C. Henry. (Herb. propr. n. 22237.)

This rather pretty species seems quite distinct from any yet described. The leaves are in shape much like those of *Perilla ocimoides* Linn., and Mr. Henry tells me the odour of the plant is very strong and unpleasant.

ON THE BOTANICAL TERMS FOR PUBESCENCE.

By F. B. Forbes, F.L.S.

It is to be regretted that M. Alphonse DeCandolle, in chapter xiv. of 'La Phytographie,' did not extend his discussion of difficulties in botanical terms, and deal with some of the expressions of pubescence as he did with *glaucus*, *pruinosus*, and *lanceolatus*. Mr. Bentham, in his well-known 'Introduction to Local Floras,' had already drawn attention to the "vagueness in the use practically made by different botanists" of the terms for pubescence; but the vagueness has not diminished since then, and every student would have welcomed the opinion of so high an authority as Mons. A. DeCandolle on the relative value of these words.

My meaning will be best shown by a short list of definitions, collated from the following works:—

Linnæus.—Termini Botanici (1767).
DeCandolle.—Théorie Elem. Bot. (1819).
Lindley.—Glossary (Ed. 1861).
Bentham.—Introd. to Flora Hongkongensis (1861).
Germain de St. Pierre.—Nouv. Dict. de Botanique (1870).
Hooker fil.—English Ed. of Lemaout & Decaisne Syst. Bot. (1873).
Henslow.—Dict. of Bot. Terms (1875).
Asa Gray.—Bot. Text-Book (1880).

Definitions.

Pilosus.

Linn.—Pilis distinctis elongatis tectus.
DC.—Garni de poiles peu couchés et legèrement roides.
Lindl.—Covered with somewhat erect loose distant hairs.
Benth.—When the surface is thinly sprinkled with rather long simple hairs.
G. St. P.—Garni de poiles peu serrés, assez longs, inégaux, ni dressés ni apprimés, plutôt gros que fins.

Hook. f.—When the hairs are long and scattered.
Hensl.—Synonym for "hairy." Hairy (*hirsutus*).
A. Gr.—Hairy in general with any sort of pilosity; in particular, with soft and distinct hairs.

HIRTUS.

DC.—Synonym of *hispidus*.
Lindl.—Synonym of *hirsutus*.
G. St. P.—Couvert de poils courts et roides.
Hensl.—Shaggy: when the pubescence is composed of long but not stiff hairs.
A. Gr.—Hairy: nearly the same as *hirsutus*.

HIRSUTUS.

DC.—Garni de poils longs et nombreux.
Lindl.—Covered with long, tolerably distinct hairs.
Benth.—When the hairs are dense, and not so stiff.*
G. St. P.—Couvert de poils longs et roides.
Hook. f.—When the hairs are long and numerous.
Hensl.—When the hair is less soft, and longer than in the form termed "pubescence" or "down."
A. Gr.—Pubescent, with rather coarse or stiff hairs.

HISPIDUS.

Linn.—Setis rigidis adspersus. *Setæ* = pili rigidiusculi teretiusculi.
DC.—(Hirtus) Garni de poils roides non couchés.
Lindl.—Covered with long stiff hairs.
Benth.—When more thickly covered† with rather stiff hairs.
G. St. P.—Couvert de poils longs très roides et presque piquants, ou d'aiguillons très fins, setacés ou subulés.
Hook. f.—When the hairs are erect and stiff.
Hensl.—Where the pubescence is composed of long and rigid hairs.
A. Gr.—Beset with rigid or bristly hairs, or with bristles.

STRIGOSUS.

Linn.—Aculeis lanceolatis rigidis armatus. *Strigæ* = pili rigidiusculi planiusculi.
DC.—*Striga* = petite écaille étroite, allongée et qui ressemble à un poil.
Lindl.—Covered with strigæ, *i.e.*, sharp close-pressed rigid hairs. Linnæus considers this word synonymous with *hispidus*.
Benth.—When the hairs are rather short and stiff, and lie close along the surface all in the same direction.
G. St. P.—Rude et presque piquant en raison de poils roides et robustes; par exemple, la tige et les feuilles de la Bourrache, et d'un grand nombre d'autres Boraginées.
Hensl.—Covered with strigæ. Synonym for *hispidus*. Striga = a small straight hair-like scale.
A. Gr.—Beset with strigæ, or sharp-pointed and appressed straight and stiff hairs or bristles.

It is plain enough from these extracts that, even for terms as to which there ought to be little question among botanists, the definitions are vague or contradictory, or they so overlap each other that it is hard to choose the appropriate word for any given case.

Hirtus, for instance, defined by Germain St. Pierre as "couvert de poils courts et roides," means, according to Henslow, the exact opposite, "shaggy: when the pubescence is composed of long but not stiff hairs." And when we find that Henslow makes *pilosus* the same as *hirsutus*, which Lindley had given as a synonym of *hirtus*, which DeCandolle had already considered identical with

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* *I.e.*, "not so stiff" as in *hispidus*.
† *I.e.*, "more thickly covered" than in *pilosus*.

hispidus, which Henslow in turn makes equal to *strigosus*, it can be seen how little precision has been attained.

It would appear as if the introduction of the post-Linnean term *hirtus* was answerable for much of the confusion. According to Andrew's 'Lexicon,' the primary form of *hirsutus* was "*hirsus*, a variation of *hirtus*"; *hirsutus* being "quite classical," and *hirtus* "mostly post-Augustan." The two words are therefore identical in origin, and both are given as the equivalent of the Greek δασύς. In Botany, each author of my list who has defined *hirtus* has made it synonymous, or nearly so, with the *pilosus*, *hirsutus*, or *hispidus* of some other author, while it is noteworthy that the term is altogether passed over by Linnæus, Bentham, and Sir J. Hooker. Even, then, admitting that *hirtus* may be made to denote some special form of pubescence, the characters that separate it from its neighbours in the series must be extremely slight, and I venture to suggest that its disappearance from descriptive botany would be a step in the right direction.

Holosericeus, *sericeus*, and *velutinus* are other instances of vaguely defined words, although the three can and should be made to describe three distinct states of pubescence. *Holosericeus* is omitted by Linnæus, DeCandolle, Bentham, and Henslow; and by Germain St. Pierre it is made a synonym, in one place of *sericeus*, in another of *velutinus*, the latter also being its equivalent according to Sir Joseph Hooker. Lindley, however, seems to have carefully specialised the term as "silky: so covered with hairs that it feels soft to the touch, although the naked eye may fail to detect the presence of hairs," which, with the addition of "whitish hue," is substantially Bentham's definition of *canescens*. On the other hand, *sericeus*, without the drawback of any synonym, would appear to signify covered with fine close straight hairs of silky sheen lying along the surface, while *velutinus* should mean a covering like the pile of velvet, that is, close-pressed silky hairs, *erect, and appearing to have been cut all of the same length*.

The distinctions between *tomentosus* and *lanatus* are also rather loosely drawn; but the essential characters seem to be, for *tomentosus*, rather short, fine, more or less intricate *cottony* hairs, and for *lanatus*, long, loosely appressed and curled *woolly* hairs.

The following is an attempt to define each term, and to give it its place in one of two series, the first of which comprises pubescence of distinct hairs, the second a more or less dense covering of the whole surface described:—

Series I.

1. *Pubescens.*—Furnished with not very numerous soft and downy or short hairs. (Hairs fewer and shorter than in *villosus*).
2. *Villosus.*—Furnished with long and soft hairs lying on the surface. (Hairs finer and more appressed than in *pilosus*).
3. *Pilosus.*—Furnished with slightly stiffened distinct hairs ascending from the surface. (Hairs less coarse, shorter, and fewer than in *hirsutus*).
4. *Hirsutus.*—Beset with long and rather coarse or stiff hairs. (Hairs less rigid and erect than in *hispidus*).

5. *Hispidus*.—Beset with stout rigid or bristly erect hairs. (Hairs neither flattened nor appressed as in *strigosus*).
6. *Strigosus*.—Rough and almost prickly, on account of the strong, sharp, rather flattened hairs which lie along the surface in the same direction).

Series II.

1. *Holosericeus*.—Soft to the touch, with a close covering of very short silky hairs not distinctly visible to the naked eye. (Hairs shorter and less distinct than in *velutinus*).
2. *Velutinus*.—Covered with a close silky coating of short fine hairs, erect and of even length. (Hairs erect and not unevenly appressed, as in *sericeus*).
3. *Sericeus*.—Covered with close-pressed, fine, straight, silky hairs. (Hairs not entangled, and not so fine or long as in *arachnoideus*).
4. *Arachnoideus*.—Covered with very long, soft, white, somewhat viscous hairs, stretched and entangled like a cobweb. (Hairs less numerous, much longer, and finer than in *tomentosus*).
5. *Tomentosus*.—Covered with not very long cottony hairs, more or less felted together. (Hairs shorter and forming a less thick covering than in *lanatus*.)
6. *Lanatus*.—Covered with long hairs, loosely curled together like wool.

I have ventured to offer these remarks with less expectation than desire that botanists may think them worthy of such criticism or discussion as might lead to greater uniformity and precision in this section of glossology.

NORTHAMPTONSHIRE MOSSES.

By H. N. Dixon, M.A.

As there seems to be no record hitherto of the mosses of this county, it seemed worth while to publish this as a preliminary list, although being the result of little more than half a year's work, and that, with a few exceptions, confined to the district within a few miles of Northampton, it should not be long before it is very materially enlarged. It will be seen, for instance, that the Sphagna, and indeed the bog-mosses generally, are totally unrepresented, nothing of the nature of bog having come under my notice. I am indebted to Mr. J. E. Bagnall for having most kindly examined all the species which seemed to require confirming or which I was unable to identify. (N.B—b. = barren, f. = in fruit.

Weissia viridula Brid. Brampton.

Dicranella varia Hedw. Not common. Yardley Chase, &c.—*D. rufescens* Turn. Rare. Harleston Firs (♂).—*D. heteromalla* Hedw. Common.

Dicranium scoparium L. Common (b.).

Campylopus pyriformis Brid. Harleston Firs, &c.

Pleuridium nitidum Hedw. Great Houghton (b.). Mr. Bagnall was not quite certain of this, as the specimens were immature. — *P. subulatum* L. Frequent.

Phascum cuspidatum Schreb. Abundant.

Pottia carifolia Ehrh. Abundant on wall-tops. — *P. minutula* Schwg. Northampton, Great Houghton. — *P. truncata* L. Common.

Didymodon rubellus B. & S. Walls, local (b.). — *D. luridus* Hornsch. Local and barren. Northampton, Great Houghton, &c. —*D. cylindricus* Bruch. Frequent, but always barren.

Barbula rigida Schultz. Rare. Northampton, Kingsthorpe.— *B. ambigua* B. & S. Common on the mud-caps of our walls.—*B. muralis* L. Abundant. — *B. unguiculata* Dill. Abundant. — *B. fallax* Hedw. Frequent, mostly barren. — *B. recurvifolia* Schimp. Yardley Chase (b.).—*B. spadicea* Mitt. Frequent, but barren.—*B. cylindrica* Tayl. Rare. Northampton, Great Houghton (b.) —*B. vinealis* Brid. Hardingstone (b.). — *B. revoluta* Schwg. Local. Abington, &c. — *B. convoluta* Hedw. Frequent (b.). — *B. Brebissoni* Brid. Rare. Great Houghton (b.).—*B. subulata* L. Local. Hardingstone, &c. — *B. lævipila* Brid. Common.—*B. latifolia* B. & S. Local and barren. — *B. ruralis* L. Frequent. — *B. intermedia* Brid. Local on stone walls and banks; mostly barren (f.). Great Houghton.—*B. papillosa* Wils. Local. Northampton, &c. (b.).

Ceratodon purpureus L. Abundant. Sporadically gemmiparous.

Eucalypta vulgaris Hedw. Rare. Abington, Weston Favell.

Grimmia apocarpa L. Frequent.—*G. pulvinata* Dill. Abundant.

Zygodon viridissimus Dicks. Frequent. Abundantly gemmiparous (f.). Great Houghton, sparingly.

Orthotrichum saxatile Brid. Rare. Hardingstone. — *O. affine* Schrad. Common. — *O. stramineum* Hornsch. Dallington. — *O. diaphanum* Schrad. Common. — *O. Lyellii* H. & T. Frequent, but barren. Hardingstone, Yardley Chase, &c.

Physcomitrium pyriforme L. Common.

Funaria fascicularis Dicks. Rare. Kingsthorpe. — *F. hygrometrica* L. Abundant.

Bartramia pomiformis L. Harleston Firs.

Webera nutans Schreb. Frequent.—*W. carnea* L. Kingsthorpe.

Byrum intermedium W. & M. Common. — *B. atropurpureum* W. & M. Not uncommon. — *B. cæspiticium* L., *B. argenteum* L., and *B. capillare* L. Abundant.—*B. pallens* Swartz. Kingsthorpe.

Mnium cuspidatum Hedw. Frequent (b.).—*M. undulatum* Hedw. Common (b.). — *M. hornum* L. Not common. — *M. punctatum* Hedw. Great Houghton (b.).

Aulacomnion androgynum L. Not common. Northampton, &c. Gemmiparous.

Atrichum undulatum L. Common.

Pogonatum nanum Neck. Not common. Harleston Firs. — *P. aloides* Hedw. Kingsthorpe.—*P. urnigerum* L. Harleston Firs.

Polytrichum piliferum Schreb. Not common. Kingsthorpe. — *P. juniperinum* Willd. Harleston Firs, &c. — *P. commune* L. Common. Var. *fastigiatum* Lyle. Harleston Firs (b.).

Fissidens bryoides Hedw. Common. — *F. exilis* Hedw. Rare. Great Houghton. — *F. incurvus* W. & M. Yardley Chase. — *F. adiantoides* Hedw. Rare. Abington (b.). — *F. taxifolius* L. Common.

Fontinalis antipyretica L. Not common (b.).
Cryphæa heteromalla Hedw. Local. Hardingstone, &c.
Leucodon sciuroides L. Common, but barren.
Neckera complanata L. Common (f.). Yardley Chase.
Leskea polycarpa Ehrh. Common.
Anomodon viticulosus L. Frequent, but barren.
Thuidium tamariscinum Hedw. Common (b.).
Thamnium alopecurum L. Yardley Chase (b.).
Climacium dendroides L. Dallington Heath (b.).
Isothecium myurum Poll. Very common.
Homalothecium sericeum L. Abundant; generally barren.

Brachythecium glareosum B. & S. Common (b.). — *B. velutinum* L. Common.—*B. rutabulum* L. Abundant.—*B. populeum* Hedw. Common.

Eurhynchium myosuroides L. Frequent. — *E. striatum* Schreb. Frequent (b.) — *E. piliferum* Schreb. Rare. Yardley Chase (b.). —*E. Swartzii* Turn. Local (b.).—*E. prælongum* Dill. Abundant.

Rhynchostegium confertum Dicks. Common.—*R. murale* Hedw. Local. Althorpe, &c.—*R. ruscifolium* Neck. Frequent.

Plagiothecium denticulatum L. Frequent.

Amblystegium serpens L. Abundant.—*A. irriguum* Wils. Abington. &c. (b.).—*A. riparium* L. Common and variable. A barren var. from meadows, Northampton, Mr. Bagnall says is very near var. *longifolium*. A submerged var. with long narrow leaves. Yardley Chase.

Hypnum fluitans L. Not common. Yardley Chase (b.). — *H. filicinum* L. Not uncommon.—*H. cupressiforme* L. Abundant and very variable. Var. *filiforme*. Yardley Chase. — *H. resupinatum* Wils. Yardley Chase. — *H. cuspidatum* L. Common, mostly barren. — *H. Schreberi* Ehrh. Frequent (b.). — *H. purum* L. Common (f.). Yardley Chase.

Hylocomium splendens Dill. Frequent (b.). — *H. squarrosum* L. Common (b.). — *H. triquetrum* L. Common.

SCOTTISH PLANTS AND 'TOPOGRAPHICAL BOTANY.'

By Prof. James W. H. Trail, M.D., F.L.S., and John Roy.

Finding as the result of a careful examination of the county records for Forfar, Kincardine, Aberdeen N. and S., Banff and Elgin, as given in Watson's 'Topographical Botany,' ed. 2, that we are able to make several additions and corrections on them, the

result of investigations of several years' duration, we have put together the following notes. The present is the most favourable time to publish such records, and we therefore now submit them to the readers of the 'Journal of Botany.'

Thalictrum minus L. Of this plant var. *maritimum* alone occurs in at least Aberdeenshire and Banffshire. We have found it also, though rarely, at St. Cyrus in Kincardineshire, but in that county there are few localities suitable for it.

Ranunculus aquatilis, peltatus Fries. Add Kincardine and Aberdeen N.—*R. fluitans* L. In Banff, in the River Isla at Cairnie. Found by the Rev. Dr. Keith.—*R. Flammula* L., var. *pseudo-reptans*. On the Sands of Barry in Forfar (Fergusson).—*R. reptans* L. Aberdeen N., on marshy shores of Loch of Strathbeg near Peterhead (Trail).—*R. hirsutus* Curt. Found by Mr. Duncan in Aberdeen N., near Slains, but apparently as a casual.

Caltha radicans Forster. has been re-discovered by Mr. Sturrock in Forfarshire (*vide* 'Scottish Naturalist').

Nuphar luteum Sm., var. *minus* Syme, is found in Loch Kinnord (and probably elsewhere) on Deeside, and in the Corbie Loch, a few miles north of Aberdeen, all in S. Aberdeen.—*N. pumilum* Sm. Recorded from Kincardine and from S. Aberdeen; is probably an error, the above variety having been mistaken for it.

Papaver Argemone L., is very rare, and only a casual at best, in S. Aberdeen.—*P. Rhœas* L., cannot be regarded as anything but a rare casual north of Montrose, even if it is indigenous in Forfarshire. In an experience of over twelve years it has only once been found by us near Aberdeen, in late autumn, in a potato field.

Fumaria densiflora DC., is not uncommon on the extreme northern border of Forfarshire, hence it probably occurs also in Kincardine, though not yet detected in that county. It has been found (by Mr. Taylor) in the immediate neighbourhood of Aberdeen.

Coronopus Ruellii Gaertn. The record for Banff requires confirmation.

Cochlearia officinalis L., var. *alpina*, Wats. Add Banff (Cairngorm).

Cardamine sylvatica Link. Confirm record for Forfar, and add S. Aberdeen.

Arabis petræa Lam. Add Banff (Ballindalloch).

Helianthemum vulgare Gaertn. Add N. Aberdeen (Den of Auchmedden).

Elatine hexandra DC. Confirm record for S. Aberdeenshire (Loch Callater, Roy).

Sagina subulata Wimm. Add N. Aberdeenshire (marshy links between Peterhead and Fraserburgh).

Cherleria sedoides L. Add Forfarshire (Roy).

Cerastium trigynum Vill. Add Banff (Cairngorm).—*C. semidecandrum* L. Add N. Aberdeen.—*C. tetrandrum* Curt. Add Banff (Boyndie).

Malva moschata L., and *M. sylvestris* L., are both of frequent

occurrence in the district; but though they seem perfectly established in various localities, there is no reason to regard either as indigenous in Kincardineshire or northwards.—*M. rotundifolia* L., though included in Dickie's Guide as indigenous in some localities, has even less claim than the other two species, since it cannot be regarded as even naturalised. A plant of *M. borealis* Wallr. was found on some ground near Aberdeen, under process of reclamation from an old river-bed, last summer, but was of course a mere casual.

Geranium sanguineum L. occurs in N. Aberdeen (Collieston), on coast.

Rhamnus catharticus L. occurs in Kincardine and in S. Aberdeen, along the River Dee; but though looking in some places almost native, it is not really so. — *R. Frangula* L. has no claim to be included as indigenous in N. Aberdeen.

Trifolium scabrum L., recorded from S. Kincardine, was probably recorded under a mistake for the next species; at least it needs to be confirmed for the county.—*T. striatum* L. is common in Kincardine, at St. Cyrus.

Lotus tenuis Kit. has been found in S. Aberdeen, near Aberdeen (Trail), and at Dinnet (Roy).

Astragalus Hypoglottis L. Add Banff.

Ornithopus perpusillus L. has been found in Forfar (Broughty Ferry), and in N. Aberdeen (Gight); but was possibly introduced only.

Onobrychis sativa Lam. has occurred in Forfar, but is doubtfully a native.

Lathyrus Aphaca L. may almost be said to be naturalised in Clatt, in S. Aberdeenshire (Minto); and it was found last summer near Aberdeen, as a casual. — *L. sylvestris* L. seems indigenous on cliffs in St. Cyrus, in Kincardine.

Lupinus perennis L., though not mentioned in British Floras, even as a casual, is of very frequent occurrence, and thoroughly naturalised, along the course of the River Dee, growing among shingle, either on the shores or on islands in the river. It is equally well established in several other districts of Scotland.

Sibbaldia procumbens L. The record for N. Aberdeen is very doubtful.

Potentilla procumbens Sibth. Add S. Aberdeen.

Rubus suberectus Anders. Add S. Aberdeen (Trail).—*R. plicatus* W. & N. Add Kincardine and S. Aberdeen (Trail). — *R. rhamnifolius* W. & N. Add S. Aberdeen (Trail). — *R. thyrsoideus* Wimm. Add S. Aberdeen (Trail).—*R. Radula* Weihe. Add Kincardine (Trail). — *R. corylifolius* Sm. Add Kincardine; and for var. *sublustris* add S. Aberdeen (Trail). — *R. cæsius* L. Add Kincardine (near Banchory Ternan, Sim.).

Aremonia agrimonioides L. thrives well in a small plantation near Aberdeen. It seems to be an *accidental* introduction.

Rosa mollissima Willd. Add Forfar.

Epilobium alsinifolium Vill. Add Kincardine.

Circæa Lutetiana L. is recorded for Kincardine and both Aberdeens, and *C. alpina* L. is recorded for these and Banff. The only

species gathered by us in the district is *C. intermedia*, Ehrh. We can assert confidently, from our own observations, that this is the only form met with near Aberdeen, though not previously recorded from that locality; while both the others have been (erroneously) asserted to be indigenous near the town.

Myriophyllum spicatum L., recorded from Kincardine, S. Aberdeen and Banff, has been recorded from these counties probably under a mistake for the next species, which alone we have found there.—*M. alterniflorum* DC. Add Forfar, Kincardine and Banff.

Callitriche platycarpa Kuetz. Add Forfar and N. Aberdeen.—*C. hamulata* Kuetz. Add Forfar (Loch of Rescobie, Roy).—*C. autumnalis* L. Add S. Aberdeen (Loch of Park) and Banff (Mortlach).

Sedum Rhodiola DC. Add Banff (sea-shore at Gamrie, Gregor).—*S. Telephium* L., var. *Fabaria* Koch. Naturalised in many places in Kincardine, as well as in both S. and N. Aberdeen.—*S. anglicum* Huds. formerly grew near Aberdeen (at Bridge of Dee, Roy), but is now extinct. It was probably an escape.—*S. reflexum* L. is quite naturalised in many places in S. Aberdeen, *e. g.*, near Aberdeen, and at Aboyne.—*S. album* L. occurs in Kincardine (Stonehaven), as an introduction; it can hardly yet be said to be naturalised.

Saxifraga Hirculus L., recorded with doubt from S. Aberdeen, must be excluded from the list entirely.—*S. oppositifolia* L. Add Banff (Glen Avon, Bisset).—*S. cæspitosa* L. Add S. Aberdeen (recorded by the late Dr. Macgillivray from Ben-na-buird).

Eryngium maritimum L., recorded from Kincardine and from N. Aberdeen, is totally extinct now in both districts, so far as can be judged, after a careful inspection of the localities indicated for it. The plant can hardly have been wrongly named.

Smyrnium Olusatrum L. holds its ground in the neighbourhood of old buildings in various parts of the district from Kincardine to Banff sufficiently well to permit of its being regarded as naturalised with us.

Cicuta virosa L. is not known on good authority to be found in S. Aberdeen. The record for it was an error.

Æthusa Cynapium L., though recorded from all the districts in this part of Scotland, is only a garden weed; though plentiful in certain gardens, it can hardly be called naturalised fully.

Anthriscus vulgaris Pers. Add Banff. This plant is of very local distribution in the north-east of Scotland.

Sambucus Ebulus L. is recorded from all the counties included in the present list as native; but there is great reason to doubt its being native in any of them. Its habitats are in all cases suspiciously near ruins.

Viburnum Opulus L., recorded with doubt from S. Aberdeen, is as well established there as in Kincardine, though probably naturalised in both.

Linnæa borealis Gronov. Add N. Aberdeen.

Galium Cruciata Scop. is extremely local in S. Aberdeen, while its records for N. Aberdeen and for Banff are very doubtful indeed.

Knautia arvensis Coult. is rare in Aberdeenshire and in Banff, and can hardly be said to be naturalised thoroughly in either.

Sonchus asper Hoffm. Add Aberdeen S. and N.

Hieracium alpinum L. Add Banff (Roy). — *H. holosericeum* Bach. Add Banff (Roy).—*H. nigrescens* Willd. Add Banff (Roy). — *H. murorum* L. Add Banff. — *H. cæsium* Fries. Add Banff (Roy). — *H. vulgatum* Fries. Add Banff. — *H. prenanthoides* Vill. Add Forfar, Kincardine and Elgin (Dr. Gordon).—*H. corymbosum*. Add Kincardine and S. Aberdeen (Trail).

Taraxacum officinale Wigg., vars. *erythrospermum* and *lævigatum*. Add S. Aberdeen; the latter is confined to the sandhills along the coast.

Solidago Virgaurea L. Add. N. Aberdeen.

Senecio viscosus L. Add Banff (Portsoy, Bisset).

Tanacetum vulgare L. Recorded for all the counties under consideration; is not native in any, though well established in many places in all of them.

Arctostaphylos alpina Spreng. Recorded for Forfar and for S. Aberdeen; is so doubtful for both that it should probably be excluded, if not confirmed by additional records.

Gentiana Amarella L. Add Banff.

Erythræa Centaurium Pers. The record of S. Aberdeen is erroneous.

Cuscuta europæa Murr. is not native or even naturalised in S. Aberdeen.

Veronica saxatilis L. requires confirmation as occurring in Banff. —*V. polita* Fries. A corn-field weed in S. Aberdeen. — *V. Buxbaumii* Ten. is thoroughly naturalised, and in many places is common in Kincardine, S. and N. Aberdeen, Banff and Elgin.

Linaria vulgaris Mill. is naturalised in a good many places in Kincardine, S. Aberdeen, and Banff.—*L. Cymbalaria* Mill. is also naturalised on old walls in various localities near Aberdeen.

Lycopus europæus L. Add S. Aberdeen (beside Loch Kinnord, Roy). It is very rare there, as well as in Kincardine.

Lamium album L. is common in many places in Kincardine, S. Aberdeen, and Banff (Portsoy). — *L. intermedium* Fries. Add Kincardine.

Galeopsis versicolor Curt. Add Elgin.

Myosotis palustris With. Add Kincardine (Arbuthnott, Trail) and N. Aberdeen (along the Ythan at Ellon).

Anchusa sempervirens L. is quite naturalised in several localities in Forfar, Kincardine, S. Aberdeen, Banff, and Elgin.

Asperugo procumbens L. Naturalised in N. Aberdeen in one locality.

Symphytum officinale L. is naturalised here and there in Kincardine, and in S. and N. Aberdeen (near Brucklay).

Cynoglossum officinale L. occurs in Banff (Den of Boyne), but probably was introduced.

Plantago media L. has been found in S. Aberdeen (Drumoak), but is doubtfully native there as well as in N. Aberdeen.

Chenopodium urbicum L., *intermedium*, and *C. rubrum* L. in

'Topographical Botany,' are recorded from S. Aberdeen, but probably erroneously in each case.

Atriplex laciniata Sm. (*arenaria* Woods) is also recorded for S. Aberdeen, and is also a probable error of observation. The same applies to *A. littoralis* L.

Rumex conspersus Hart. Add Kincardine (St. Cyrus). — *R. sanguineus* L. Add N. Aberdeen and Banff.

Euphorbia Peplus L. Add Kincardine.

Humulus Lupulus L. may almost be said to be naturalised here and there, in Forfar, Kincardine, and S. Aberdeen.

Betula alba L. Add N. Aberdeen.

Salix ambigua Ehrh. Add S. Aberdeen (between Aboyne and Tarland, Roy).—*S. Lapponum* L. Add Banff (Cairngorm),

Neottia Nidus-avis Rich. Add Elgin (Nairn, Miss Grant.)

Listera ovata Br. Add N. Aberdeen.

Orchis incarnata L. Add Kincardine and S. and N. Aberdeen.

Habenaria bifolia Bab. Add Forfar and Kincardine. — *H. chlorantha* Bab. Add Forfar.

Malaxis paludosa Sw. Add Elgin (Nairn, Croall).

Narcissus Pseudo-narcissus L. Naturalised (originally planted) in S. Aberdeen (Banchory Ternan), and in N. Aberdeen (near Old Deer).

Allium vineale L. Add N.Aberdeen (Collieston).—*A. oleraceum* L. occurs in Kincardine (St. Cyrus) under circumstances that would seem sufficient proof that it is native there.

Gagea lutea Ker. Add S. Aberdeen (formerly in a wood near Balmoral, Roy) and Elgin (Nairn, Rev. J. Brichen).

Scilla verna Huds. grows in Elgin at Covesea (Miss Johnstone).

Polygonatum multiflorum All. and *P. officinale* All., which are both recorded from S. Aberdeen, are not found there, except perhaps as casuals.

Tofieldia palustris Huds. The record for Elgin requires confirmation.

Anacharis Alsinastrum Bab. is well naturalised in numerous pools in Forfar, Kincardine, and S. Aberdeen.

Potamogeton obtusifolius M. & K. Add S. Aberdeen (Loch of Kinnord). — *P. nitens* Web. Add S. Aberdeen (in the Don). — *P. natans* L. (segr.). Add Kincardine and N. Aberdeen.

Typha latifolia L. is well naturalised in one or two localities in S. Aberdeen (Loch of Park), and in N. Aberdeen (Drumblade, Barker).

Luzula arcuata Hook. Record for Forfar much needs confirmation.

Rhynchospora alba Vahl, though given for all the counties, has not been met with by us.

Scirpus fluitans L. Add Banff, (Portsoy).

Carex leporina L. Add Banff (Prof. Balfour). — *C. remota* L. is very local in the district, but is present also in S. Aberdeen (Drumoak). — *C. intermedia* Good. Add S. Aberdeen (between Aberdeen and Ellon, Trail). — *C. paniculata* L. Add Kincardine and Banff.—*C. acuta* L. was recorded from the counties in question

under error, *C. aquatilis* having been mistaken for it.—*C. flava* L. (segr.) Add Forfar and Kincardine. — Var. *lepidocarpa*. Add Forfar and Kincardine. — Var. *Ederi*. Add Kincardine. — *C. vaginata* Tasch. Add Banff (Cairngorm, on which it was found by G. Don in the year 1802).—*C. sylvatica* Huds. Add Kincardine (Fettercairn.)—*C. vesicaria* L. Add Forfar and Kincardine. Very scarce.

Sesleria caerulea Scop. is not found in S. Aberdeen, so far as known.

Aira uliginosa Weihe. Add Banff.

Melica uniflora Retz. seems recorded from S. Aberdeen in error.

Schlerochloa distans Bab. Add S. Aberdeen (on sandhills along the coast).—*S. rigida* Link. was found rather abundantly on some waste ground in the neighbourhood of Aberdeen, but probably as a casual.

Poa laxa Haenke. Add Forfar. —*P. stricta* Lindb. Add Forfar. Canlochan is the habitat of both. —*P. nemoralis* L. Add Banff.

Lolium italicum Braun. is plentiful in hayfields; from these it has naturalised itself in many parts of all the divisions of the north-east of Scotland. — *L. temulentum* L, Add Elgin (*fide* Dr. Gordon).

Polypodium calcareum Sm. S. Aberdeen (Scotston Moor, in a quarry; for years extinct; a very doubtful native). Its record for N. Aberdeen is probably erroneous.

Allosorus crispus Bernh. Add N. Aberdeen (Culsalmond).

Polystichum lobatum Sw. Add Banff (Glenrimmes).

Lastrea Oreopteris Presl. Add N. Aberdeen and Banff. — *L. spinulosa* Presl. Cònfirm records for Forfar and Kincardine.

Asplenium viride Huds. Add Banff.

Hymenophyllum Wilsoni Hooker belongs to S. Aberdeen rather than to N. Aberdeen, being found only on Ben-na-chie in this district.

Lycopodium annotinum L. Add Kincardine.—*L. inundatum* L. occurs in Kincardine (Strachan), and in more than one locality in S. Aberdeen (Roy).

Selaginella selaginoides Gray. Add N. Aberdeen and Banff.

Equisetum variegatum Schl. Add S. Aberdeen (mouth of River Ythan).

A SYNOPSIS OF THE GENUS *SELAGINELLA*.

By J. G. Baker, F.R.S., &c.

(Continued from p. 113.)

138. S. DELTOIDES A. Br. in Crypt. Nov. Gran. 371. — Stems trailing, 2–3 in. long, copiously pinnate, the lower branches slightly compound. Leaves of the lower plane crowded and ascending towards the tip of the branches, spaced and spreading on the main stem, oblong-lanceolate, subacute, a line long, bright green, firmer in texture than in *albonitens*, rather more produced on the upper side of the midrib, not ciliated, cordate on the upper side at the base, and imbricated over the stem; leaves of the upper

plane half as long, oblique ovate, acute, not cuspidate. Spikes square, ½–1 in. long, 1 lin. diam; bracts ovate-lanceolate, rigid, strongly keeled.

Hab. Inundated caatingas at Panuré, on the Rio Uapes, *Spruce* 2535! A near ally of *S. albonitens*.

139. S. FLAGELLATA Spring Mon. ii. 208. — Stems trailing, intermatted, half a foot long, the branches erecto-patent, the lower copiously compound, the branchlets excurrent and whip-like at the end. Leaves of the lower plane ovate-lanceolate, very acute, above a line long, pellucid, bright green, more produced on the upper side of the midrib, rounded at the base, shortly ciliated, and imbricated over the stem; leaves of the upper plane one-third as long, ovate-acuminate, falcate, convergent. Spikes ⅓–½ in. long; bracts very acuminate, strongly keeled.

Hab. In French Guiana, on rocks on the banks of the streams of Upper Oyapok, *Leprieur*.

140. **S. rhizophora,** n. sp. — Stems very slender, trailing, ½ ft. long, closely pinnate, the erecto-patent branches copiously compound, both branches and main stem often excurrent and whip-like at the tip. Leaves of the branchlets oblong-lanceolate, contiguous and ascending, of the main stem ovate-lanceolate, spaced and nearly spreading, acute, 1-12th to 1-18th in. long, bright green, membranous, rather unequal-sided, broadly rounded, serrulate, and a little imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, oblique ovate, with a long cusp. Spikes square, ¼–½ in. long, ½ lin. diam.; bracts crowded, ovate-lanceolate, strongly keeled.

Hab. In woods near the towns of San Juan and Panama, *Seemann* 29! 32!

Series II.—ASCENDENTES.

Group I.—SUBERECTÆ.

141. S. YEMENSIS Spring Mon. ii. 193; *S. aduncа* A. Br.; *Lycopodium yemense* Sw. Syn. Fil., tab. 4, fig. 4.—Stems 6–9 in. long, wiry, decumbent and unbranched, with root-fibres from the nodes in the lower part, decompound upwards, with dense erecto-patent flabellately compound branches. Leaves obscurely dimorphous, those of the lower plane imbricated, usually adpressed to the stem, rarely erecto patent, oblong, cuspidate, ½ lin. long, rigid in texture, with a distinct white serrulate edge; those of the upper plane rather shorter and more erect. Spikes short, square, ¾–1 lin. diam.; bracts deltoid, with a long cusp, strongly keeled.

Hab. West Himalayas, ascending to 3000 feet in Gurwhal, and mountains of Arabia and Abyssinia. A near ally of *sanguinolenta* and *borealis*, and a connecting link between the subgenera *Euselaginella* and *Stachygynandrum*.

142. S. BOREALIS Spring Mon. ii. 96; *S. Jacquemontii* Spring Mon. ii. 194; *Lycopodium boreale* Kaulf. — Stems densely matted, terete, very slender, wiry, bright red, usually ascending, forked low down, reaching a length of ½ ft. or more, distantly pinnately branched, with short copiously compound branches. Leaves slightly dimorphous, those of the lower plane close, erecto-patent,

obovate, ½ lin. long, cuspidate, firm in texture, convex on the back, with a distinct keel, slightly oblique; those of the upper plane erect and rather smaller. Spikes square, ¼–½ in. long, ½ lin. diam.; bracts deltoid, acute, imbricated, ½ lin. long, angular on the back.

Hab. Eastern Siberia, Kamschatka, and Eastern Himalayas. Habit of *S. sanguinolenta*, from which it differs by its slightly dimorphous leaves. Rarely the stems are decumbent, with root-fibres from the upper nodes.

143. **S. neocaledonica,** n. sp. — Stems suberect, with root-fibres from the base only, reaching a length of half a foot, distantly pinnate, the short erecto-patent branches sparingly compound. Leaves of the lower plane close on the branchlets, spaced on the main stem, erecto-patent, ovate, subacute, bright green, firm in texture, not more than ½ lin. long, nearly equal-síded, serrulate, rounded at the base on the upper side, and a little imbricated over the stem; leaves of the upper plane half as long, ovate, acute, not cuspidate. Spikes short, square, ½ lin. diam.; bracts ovate, strongly keeled, scarcely longer than the sporangia.

Hab. New Caledonia, in damp places on the mountains of Balade, *Vieillard* 1690!

144. **S. Macgillivrayi,** n. sp. — Stems reaching a length of 6–9 in., suberect, with root-fibres from the base only, bisulcate on the face, scarcely at all branched in the lower third or quarter, distantly branched upwards, the branches ascending and little compound. Leaves of the lower plane contiguous on the branchlets, much spaced on the stem, nearly spreading, ovate-oblong, obtuse, flat, 1 lin. long, bright green, moderately firm in texture, nearly equal-sided, rounded and shortly ciliated, and a little imbricated over the stem at the base on the upper side; leaves of the upper plane half as long, ovate, acute. Spikes short, square, ½ lin. diam.; bracts ovate, acute, strongly keeled, scarcely longer than the sporangia.

Hab. Isle of Pines, in clefts of rock near the summit of the main peak, *Macgillivray* 729! *Milne* 208!

145. S. BARBATA Spring Mon. ii. 204, ex parte.—Stems suberect, half a foot long, with root-fibres from the base only, copiously pinnate, angled on the face, the close erecto-patent branches copiously compound. Leaves of the lower plane close on the branches, spaced on the stem, ovate, acute, ascending, a line long, bright green, moderately firm in texture, nearly equal-sided, broadly rounded and ciliated on both sides at the base, imbricated on the upper side over the stem; leaves of the upper plane half as long, oblique ovate, acute. Spikes short, 1 lin. diam.; bracts deltoid, with a long cusp, strongly keeled.

Hab. Philippines, *Cuming* 2014!

146. **S. suberecta,** n. sp.— *S. barbata* Spring Mon. ii. 204, ex parte.—Stems suberect, 6–9 in. long, rounded on the back, acutely angled on the face, little branched in the lower third, copiously branched upwards with crowded ascending very compound branches. Leaves of the lower plane crowded and much imbricated on the branchlets, nearly contiguous on the main stem, ascending, oblique

ovate, acute, 1-12th to 1-8th in. long, bright green, moderately firm in texture, more produced on the upper side of the midrib, shortly ciliated on the upper side, very cordate on the upper side at the base, and much imbricated over the stem; leaves of the upper plane half as long, oblique ovate, cuspidate, much imbricated on the branchlets. Spikes not seen.

Hab. Malacca, *Griffith*! Upper Yangtze, China, *Francis*!

147. S. ACUTANGULA Spring Mon. ii. 2061. — Stem erect, about half a foot long, with root-fibres confined to the base, strongly angled down the face, decompound, closely pinnate, the ascending branches copiously pinnate. Leaves of the lower plane rather spaced both on the stem and branches, spreading, lanceolate-rhomboid, acute, bright green, moderately firm in texture, 1-12th in. long, unequal-sided, more rounded, strongly ciliated and imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, ovate, with a long cusp, conspicuously ciliated. Spikes square, copious, $\frac{1}{4}$–$\frac{1}{2}$ in. long, 1 lin. diam.; bracts ovate, acute, crowded, strongly keeled.

Hab. Malacca, *Griffith*!

148. S. ERECTIFOLIA Spring Mon. ii. 92; *S. camptostachys* Fée Fil. Bras. 295, tab. 75, fig. 3.—Stems 3–6 in. long, suberect, with root-fibres from the base only, copiously pinnate, the erecto-patent branches considerably compound. Leaves of the lower plane ascending and contiguous both on the stem and branches, oblong-lanceolate, acute, bright green, moderately firm in texture, $\frac{1}{2}$ lin. long, nearly equal-sided, rounded, shortly ciliated and imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, ovate, cuspidate, much imbricated. Spikes square, $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{1}{2}$ lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Rio Janeiro, *Swainson*! *Glazion* 2242!

149. **S. Pearcei,** n. sp.—Stems suberect, 6–9 in. long, with root-fibres from the base only, bisulcate down the face, copiously pinnate, the erecto-patent branches considerably pinnately compound. Leaves of the lower plane spreading or rather ascending, contiguous on the branches, spaced on the main stem, ovate-lanceolate, acute, $\frac{3}{4}$–1 lin. long, dark green, moderately firm in texture, rather unequal-sided, rounded and shortly ciliated and imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, ovate, acute, much imbricated. Spikes short, 1 lin. diam.; bracts ovate, acute, serrulate, strongly keeled.

Hab. Cordilleras of Pozuzo, alt. 6000 feet, *Pearce*!

Group II.—ATROVIRIDES.

150. **S. microclada,** n. sp.—Stems suberect, 4–6 in. long, with root-fibres only from the lower part, flat on the back, bisulcate down the face, flabellately decompound, the leaflets of all the branchlets very much smaller than those of the stem. Leaves of the lower plane spaced even on the branchlets, spreading or ascending, oblique ovate, subacute, $\frac{1}{8}$ in. long, pale green, moderately firm in texture, very unequal-sided, not all ciliated, broadly rounded and

much imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, ovate. shortly cuspidate. Spikes not seen.

Hab. Chong-tong, Sikkim, alt. 4000 feet, *Dr. Anderson*, 1404!

151. S. Plumea Spring Mon. ii. 136.—Stems suberect, ½–1 ft. long, the root-fibres confined to the base, bisulcate on the face, flat on the back, decompound, the branching between pinnate and flabellate. Leaves of the lower plane crowded on the branchlets, rather spaced on the main stem, oblong-lanceolate, acute, ⅛–⅙ in. long, bright green, not very firm in texture, very cordate, shortly ciliated and much imbricated over the stem on the upper side at the base; leaves of the upper plane small, obovate, imbricated, with a cusp as long as the blade. Spikes copious, ¼–½ in. long, 1 lin. diam.; bracts ovate, acuminate, strongly keeled.

Hab. Malay peninsula, *Griffith*! *Lady Dalhousie*! *Maingay* 1832!

(To be continued.)

SHORT NOTES.

Epilobium alsinifolium in Ireland.—The Royal Irish Academy having placed at my disposal a small grant for the purpose of making a botanical survey of Ben Bulben, in Sligo, and of the adjoining mountain range in Leitrim, I visited the district early in the present month with Mr. R. P. Vowell, and we were fortunate enough to discover *Epilobium alsinifolium*, hitherto unrecorded from Ireland. Mr. J. G. Baker and Mr. A. G. More have kindly examined the specimens, to remove any doubts. They were gathered at the base of the limestone cliffs in Glenade, Leitrim, at an elevation of about 1000 feet, growing in the springs and at the foot of small trickling waterfalls, just sufficient to keep the rocks thoroughly wet. This species is an interesting addition to the Irish list, and to the alpine flora of a district already well known for its botanical rarities.—R. M. Barrington.

Lepidium Smithii Hooker in Cambridgeshire. — This species, possibly hitherto overlooked, has been found in District 7 growing on Blacknoor Drove, in Sutton parish. The allied species, *L. campestre* Br., often produces ten or twelve stems from the same rosette, even when the main central stem is uninjured, so that in a young state the two species may easily be mistaken one for the other, unless carefully examined. *L. Smithii* may be known by its woody rootstock, more decumbent stems, violet stamens, and by having the styles in all stages decidedly longer than those of *campestre*. The distribution of this latter plant in this part of Cambridgeshire and the adjacent lands of Huntingdon is very curious, and at first sight apparently due to accidental causes acting with unusual irregularity; but careful investigation shows that the plant follows the course of the Old West Water from its entrance into the country at Earith to Chatteris Ferry, and that it was carried from thence by the old Slade Lode through Hook

towards March, where the latter watercourse fell into the Old Nene. Along these silted-up rivers, and by the old "crooked dykes" that carried off, and were subjected to, their overflows through the fens, *L. campestre* occurs in some abundance. There is a map of the ancient drainage of the fens in Dugdale's 'Drainage and Imbanking,' which suggested and explains the theory of distribution here given. It must be borne in mind that the former course of these old waters is now dry, and for the greater part level with and undistinguishable from the surrounding fens.—Alfred Fryer.

Euphorbia Lathyris in Northamptonshire.—This plant occurs truly wild in the Great Wood, near Wakerley, in some little quantity. No introduced plant was near. Mr. Lewin found it near Fineslade, and Mr. Mott gathered it on the borders of Bedford Purlieus: so its range is fairly wide in that great woodland tract. At Wakerley it is associated with *Dipsacus pilosus*, *Atropa Belladonna*, and *Ophrys apifera*. Under these conditions we may regard Wakerley as one of the "few stony woods" in which, according to Babington's 'Manual,' it is "truly wild."—G. C. Druce.

Distribution of Callitriche obtusangula LeGal.—In a dyke near the Welland, in the vicinity of Borough Fen, Northamptonshire, I found the above plant associated with *Lemna minor*. A few days after, when at Wolverton, in W. Norfolk, I found it in splendid condition in some dykes close to the sea, the rosette of obovate leaves in their arrangement suggesting the flowers of *Iberis umbellata*, being quite different in appearance to any other *Callitriche*: in this locality a *Ranunculus*, probably *confusus*, grew with it. I also found it near Ingoldisthorpe, in water in which a great quantity of red matter was suspended. More recently, while botanising at Moulsford, I found the *Callitriche* in ditches by the Thames on both (*i. e.*, the Oxon and Berks) sides of the river, but the profuse growth of three Lemnas quite hid the peculiar rosettes of *Callitriche*, and it was almost by accident that I examined the fruit, when it was clear that the plant was *obtusangula*. I brought plants home, which now show the peculiar habit. I might say that the Norfolk plant was smaller than the Oxford one, itself not so large as the *obtusangula* of St. Aubyn, Jersey.—G. C. Druce.

Peziza venosa *var.* Sumneri Berk. & Br., &c., in Suffolk.—For several years past this species has occurred in abundance at the Grove, in the parish of Great Glenham, near Saxmundham. It is found in spring growing almost as close as it can stand under and near a large cedar. Some thirty years ago I on several occasions in spring found *Verpa digitaliformis* P., *Morchella semilibera* DC., and *Peziza venosa* P. in the same neighbourhood. These are recorded in the 'Suffolk Flora' by Henslow & Skepper, but, as the *Verpa* is rare, I think it may be well to put them on record again.—E. N. Bloomfield.

Centaurea Jacea in Sussex.—My anticipations with respect to this plant (p. 150) have, I am glad to say, been realised; I have not only met with it again in the same locality as last year, but I have also found several plants of it in another upland meadow at

no great distance and in the same parish of Fairlight. Doubtless there were more plants than we observed, as those we saw were all near the footpath, and we did not like to trample the mowing standing grass, as we should have done by searching farther. Though distinct-looking enough when we were close to them, we found that we were very liable to pass them by as merely *C. nigra*. In fact we several times almost stamped on them before we observed the difference; this was more especially the case when they were not yet in blossom.—E. N. Bloomfield.

Hants Plants. — Mr. Townsend has printed a supplementary page to his 'Flora of Hampshire,' in which he gives the following additional species for the county:—*Dentaria bulbifera*, small copse near Preston Candover; *Viola stagnina*, turf bog near Holmesley; *Gnaphalium dioicum*, parish of Swarraton (see Journ. Bot. 1883, 346); *Gagea lutea*, Inham's Copse, Moundsmere; *Polypodium Dryopteris*, wood above Hankley; "though far from any garden, it must be regarded as a doubtful native of Hampshire."

Bucks Plants.—The following aquatic plants were observed in the neighbourhood of Fenny Stratford during a few days' visit in July, 1883. Some of them were growing in the Grand Junction Canal, which furnished all the Potamogetons, except *pusillus*. The others occurred in the River Ouzel:—*Ranunculus circinatus*, *Ceratophyllum demersum* in fruit, *Lemna minor*, *L. polyrhiza*, *Potamogeton perfoliatus*, *P. eu-lucens*, *P. zosterifolius*, *P. eu-pusillus*, *P. eu-pectinatus*, *Elodea canadensis*. By the margin of the water were noted—*Scutellaria galericulata* L., *Myosotis palustris* With., *Rumex aquaticus* L., *Sparganium ramosum* Huds., *Sagittaria sagittifolia* L., *Butomus umbellatus* L., *Scirpus palustris* L. *Osmunda regalis* still lingers in the woods on the lower greensand escarpment near Little Brickhill; after considerable search one plant was found growing in the company of alders, willows, and bog-mosses.—J. Saunders.

New British Hepaticæ. — Whilst spending a few days near Keswick with Dr. Carrington at Easter, we were so fortunate as to collect the following rare Hepatics:—*Radula aquilegia* Tayl., *R. voluta* Tayl., *Adelanthus decipiens* Hook., *Lejeunia microscopica* Tayl., all new to England; *Lepidozia cupressina* Sw., new to Cumberland; the rare *Lejeunia hamatifolia* Hook., *L. orata* Tayl., and *Plagiochila tridenticulata* Tayl.; also three rare mosses, *Hypnum demissum* Wils. (new to England), *Ulota Hutchinsiæ* Sm., and *Glyphomitrium Daviesii* Sm. (new to Cumberland).—W. H. Pearson.

Bedfordshire Plants.—I. Species found in South Beds. additional to those published in Journ. Bot., 1883:—*Thalictrum flavum* L. Meadow near Leighton, Mr. Piffard.—*Myosurus minimus* L. Sandy field, Flitwick.—*Ranunculus eu-heterophyllus* Fries. Pond, Sundon. —*R. pseudo-fluitans* Bosw. Stream, Limbury and Leighton.—*R. trichophyllus* Chaix. Ditches, Chorlton.—*Fumaria densiflora* DC.—In fields, Barton Hills.—*Viola permixta* Jord. Under beech trees, south of Luton.—*Polygala depressa* Wender. Warden Hills.—*Manchia erecta* Sm. Flitwick Marsh, Mr. McLaren. — *Montia fontana* L. Ampthill.—*Geranium pusillum* L.—*Medicago maculata*

Sibth. Near Clophill, Rev. H. Crouch.—*Trifolium subterraneum* L. Clophill, J. McL.—*T. striatum* L. Maulden, J. McL.—*Astragalus glycyphyllus* L. Warden Hills.—*Lathyrus sylvestris* L. Aspley Woods.—*Potentilla argentea* L. Clophill Woods, in an old sand-pit, J. McL.—*Parnassia palustris* L. Leagrave Marsh, Limbury Marsh, and the lower chalk escarpment, Streatley.—*Helosciadum inundatum* Koch. Pond at Pepperstock.—*Œnanthe fluviatilis* Coleman. River Ivel, near Leighton.—*Conium maculatum* L. Shillington.—*Galium erectum* Huds. Flitwick Marsh.—*Asperula cynanchica* L. Dunstaple Hills.—*Anthemis nobilis* L. Leagrave.—*Gnaphalium sylvaticum* L. Aspley, J. McL.—*Helminthia echioides* Gaert. Streatley, Flitwick.—*Crepis biennis* L. Aspley Heath, J. McL.—*Atropa Belladonna* L. Luton Hoo Woods, Mr. Catt, associated with *Aristolochia Clematitis*.—*Veronica Buxbaumii* Ten. Stopsley.—*Orobanche major* L. Sharpenhoe.—*Rumex conglomeratus* Murr.—*Quercus sessiliflora* Sm. Luton Hoo, Mr. Catt. Probably planted.

II. Species observed in North Beds. but not observed in South Beds.; the majority collected by Mr. McLaren, of Cardington:—*Ranunculus fluitans* L. River Ouse.—*R. hirsutus* Curt. Clover field, Cardington.—*R. parviflorus* L. Cardington, Goldington.—*Papaver hybridum* L. Cox's Pits, Bedford.—*Sinapis alba* L. Dunstable. *Sisymbrium Sophia* L. Near Cardington Mill.—**Alyssum calycinum* L. Biddenham, 1864.—*Teesdalia nudicaulis* Brown. Millbrook.—*Senebiera didyma* Pers. Cardington Cross.—*Geranium rotundifolium*.—L. Cox's Pits. *G. pyrenaicum* L. Kempston.—*Genista anglica* L. Clapham Wood.—*Trifolium ochroleucum* L., and *T. fragiferum* L. Park Lane.—*T. filiforme* L. Cardington.—*Lotus tenuis* Kit. Harrowden Hill.—*Vicia sylvatica* Sheerhatch Wood.—*V. lutea* L. Railway bank, Cardington.—*Sanguisorba officinalis* L. Cardington.—*Geum rivale* L. Putnoe Wood.—*Apium graveolens* L. Elstow and Midburgh.—*Sison Amomum* L.—*Sium latifolium* L. By the River Ouse.—*Smyrnium Olusatrum* L. Elstow.—*Dipsacus pilosus* L. Little Warden Wood.—*Centaurea solstitialis* L. Goldington.—*Achillea Ptarmica* L. By the River Ouse.—*Artemisia Absinthium* L. Sandy.—*Senecio erucifolius* L. Park Lane.—**Erigeron canadense* L. Casual. In an old garden.—*Limosella aquatica* L. River Ouse, Fenlake.—*Melampyrum cristatum* L. Clapham.—*Mentha sativa* L. Goldington.—*Calamintha menthifolia* Host. Cardington.—*Lithospermum officinale* L. Manor Wood.—*Myosotis collina* Reich. Cardington.—*Cynoglossum officinale* L. Cox's Pits.—*Lysimachia vulgaris* L. By the River Ouse.—*Anagallis cerulea* Sm. A garden weed. Cardington.—*Chenopodium polyspermum* L. Cotton End.—*Atriplex deltoidea* Bab. Cardington.—*Rumex pulcher* L. Cardington.—*R. Hydrolapathum* Huds. By the River Ouse.—*Mercurialis annua* L. Bedford, Ford End.—*Urtica pilulifera* L. A garden weed fifty years. Sifford.—*Acorus Calamus* L. By the River Ouse.—*Potamogeton lucens* L., var. *acuminatus*. River Ouse. *Hydrocharis Morsus-ranæ* L. Ditch, Goldington.—*Allium vineale* L. Park Lane.—*Juncus compressus* Jacq. Cox's Pits.—*Scirpus palustris*

L., and *Carex acuta* L. By the River Ouse.—*Calamagrostis lanceolata* Roth. Warden Wood.—*Festuca loliacea* Huds. Meadows by the River Ouse.—*Brachypodium pinnatum* Beauv. Cardington, Manor Wood.—JAMES SAUNDERS.

PETASITES OFFICINALIS Moench.—In English botanical works the subject of these notes is credited with being subdiœcious, but as far as my experience extends—and I have examined a large number of specimens from various localities within the last two or three years—the species is distinctly diœcious functionally, if not absolutely so, from a purely structural standpoint. A good many British botanists seem totally unacquainted with the female plant, and the distribution of the two sexes in Britain never seems to have been worked out. With a view of calling the attention of workers in various parts of the country to these points of interest, the following notes are hastily written. The male plant is undoubtedly by far the most common in Britain, and, judging from the material in the herbaria at Kew and at the British Museum, the same remark holds good with regard to the Continent. The flower-heads are more shortly stalked, and are much larger than those of the female; the silky white pappus is shorter and much less abundant, and the style-arms never separate, but form a thick clavate mass. In the female, on the other hand, the flower-heads are considerably smaller, and the raceme, as a rule, much more branched; the pappus, too, is longer and much more abundant. Not unfrequently, in the centre of female flower-heads, may be found a few flowers which approach in structure those of the common male plant, but the pollen always seems abortive, is irregular in form, and apparently imperfect, the spine-like processes so conspicuous nearly throughout the entire composite family being either absent or but very partially developed. The style-arms, too, do not become divaricated, as in the truly female flowers, but remain connate, as in the ordinary male plant. The synonymy of the male plant is as follows:—*Petasites vulgaris* Desf., *P. riparia* Jord., *P. Reuteriana* Jord., *Tussilago Petasites* L. That of the female—*Tussilago hybrida* L., *T. Sebethia* Ten., *Petasites vulgaris β. hybrida* Hook., *P. pratensis* Jord. I have not seen specimens of *P. consimilis* Jord., *P. macrophyllus* Schur., and *P. intermedia* Hoppe; so am not certain to which of the sexes to refer them. In Mr. Watson's herbarium there is not a single specimen of the female plant from any southern county, but in Borrer's there is a single specimen from Egham, Surrey, and another from Munden Bog, Aldenham, Herts. Warwick and Leicester seem to be the next most southern counties. In some parts of Yorkshire and Derbyshire both sexes grow together in great abundance, as also in Northumberland and Lancashire. I have seen specimens of the female plant also from near Glasgow and Edinburgh; and Dr. J. W. H. Trail informs me it is found in three localities near Aberdeen. The Orkney plants, kindly sent me by Dr. H. Halcro Johnston, were all males. From the Continent I have seen specimens from two or three localities in France, Switzerland, and Naples.—G. NICHOLSON.

OFFICIAL REPORT FOR 1883 *OF THE DEPARTMENT OF BOTANY IN THE BRITISH MUSEUM.*

By W. Carruthers, F.R.S.

The principal additions to the collections during the year have consisted in a further continuation of the valuable herbarium of Indian plants presented by Charles Baron Clarke, Esq. F.R.S., amounting to 182 species; 373 species of plants from Socotra, collected and presented by Professor Bayley Balfour; 538 species of American plants, presented by F. C. S. Roper, Esq.; 876 species of North American plants, from the Department of Agriculture, United States; 137 species of European plants from A. Bennett, Esq.; a small collection of plants from Ceylon, presented by Dr. Trimen; 27 species of Australian Orchids, presented by R. D. Fitzgerald, Esq.; a small collection of Tasmanian Mosses, presented by E. T. Newton, Esq.; 11 species of North American *Polygalaceæ*, from A. Bennett, Esq.; a small collection of European plants from Geo. Nicholson, Esq.; 22 *Orchideæ* and 3 *Aroideæ*, from H. J. Veitch, Esq.; and specimens of *Pringlea* and *Lyallia* from the 'Challenger' office. The following collections have been acquired by purchase:—1,234 plants from South Africa, collected by Rehmann; and 340 from the same region, collected by Ecklon and Zeyher; from Madagascar 707 plants collected by Hildebrandt, 531 by Baron, and 450 by Deans Cowan; 830 from the Caucasus, collected by Brotherus; 233 plants from Palestine, collected by Post; 1,500 plants from Sumatra, collected by Forbes; 700 plants from New Zealand, collected by Kirk; 368 plants from Southern California, collected by Parish; 260 plants from Florida, collected by Curtis; 219 species from Washington Territory, collected by Suksdorf; 100 species of critical plants from Sicily, collected by Jacono; 90 critical species and varieties of Willows from Kerner; 250 species of Mosses from the neighbourhood of Paris, collected by Roze and Bescherelle; 300 species of European Fungi, by Rabenhorst; 50 species of Fungi from Austria, collected by Rehm; 100 species of Fungi from Germany, from Thuemen; 100 slides of *Diatomaceæ* from Belgium, prepared by Van Heurck; 100 species of Scandinavian *Algæ*, collected by Wittrock and Nordstedt; 497 species of *Algæ* from Morocco, collected by Schousboe; 54 from Madeira, collected by Mandon; and a specimen of the rare *Broomeia congregata*, presented by Professor MacOwan.

A series of fruits from Sumatra, collected by H. O. Forbes, Esq., has been added to the collection of fruits; a portion of the trunk of a fine Yew tree from Sutton Park has been presented by his Grace the Duke of Devonshire; and 23 specimens of raw vegetable fibres from South-east Java, presented by H. O. Forbes, Esq.

To the British Herbarium there have been added the valuable herbarium of the Rev. Hugh Davies, author of 'Welsh Botanologia,' and containing the type specimens of that work; 469 species from the Rev. W. H. Painter; 116 species from C. Bailey, Esq.; 91 species from J. Saunders, Esq.; 75 species from Horace

Pearce, Esq.; 67 species from Devon and Cornwall, presented by T. R. A. Briggs, Esq.; 50 species from Wicklow, presented by Miss Kinahan; 230 preparations of cellular plants, by Mr. Joshua; and specimens of rare and critical species from the Rev. T. S. Lea, C. T. Greene, Esq., W. H. Beeby, Esq., R. F. Towndrow, Esq., Professor J. W. H. Trail, A. W. Bennett, Esq., W. P. Hiern, Esq., Rev. W. H. Cadogan, J. Cunnack, Esq., A. Brotherston, Esq., A. G. More, Esq., H. G. Glasspoole, Esq., F. C. S. Roper, Esq., A. Bennett, Esq., Rev. R. P. Murray, F. Townsend, Esq., G. C. Druce, Esq., and John Benbow, Esq.

The rare and critical British plants contributed by botanists have been incorporated with the British Herbarium; and also the plants of Samuel Dale's Herbarium, which was presented to the trustees some years ago by the Apothecaries' Company.

Specimens of Cryptogams for the British Herbarium have been presented by Geo. Nicholson, Esq., H. Boswell, Esq., J. Saunders, Esq., E. M. Holmes, Esq., Wm. Phillips, Esq,, H. G. Glasspoole, Esq., W. H. Pearson, Esq., R. V. Tellam, Esq., C. B. Plowright, Esq., and E. George, Esq. The extensive collection of British Mosses formed by the late Rev. H. H. Wood, has been purchased from his representatives, and 215 specimens of *Hepaticæ* from Carrington and Pearson.

Some progress has been made in the preparation of a fuller and more exact catalogue of the contents of the Sloane Herbarium than has hitherto existed; and the plants collected by Cunningham in China in 1680, and distributed through several volumes of the Sloane Herbarium, have been catalogued.

The collection of prints and drawings of plants has been increased by the purchase of the original drawings (221 in number) made by Dr. Bruch for the 'Bryologia Europea,' which contain unpublished material of great critical value; of a collection of original drawings of Madagascar plants, made by the Rev. Deans Cowan, and 210 original drawings formerly belonging to Dr. Roemer.

A considerable addition to the collection of autographs of botanists has been made during the year, and the whole has been arranged and mounted in one series.

NOTICES OF BOOKS.

A Synopsis of the Bacteria and Yeast Fungi. By W. B. Grove, B.A. London: Chatto & Windus. 1884.

This is an excellent little book, which will prove to be of great use to workers at the chaotic group of which it treats. Mr. Grove has translated the section devoted to the subject by Dr. Winter in the new edition of Rabenhorst's 'Kryptogamen-Flora,' and, besides this useful service, he gives us his own views on classification, and a *resumé* of the proposals of others. It may be safely admitted that few groups of plants present greater difficulties to the systematist than this, owing to the incompleteness of the life-histories; but

botanists should make a much more emphatic protest than has been made to my knowledge against the use of the purely physiological characters, which only pile confusion on our ignorance. Such physiological characters are the defect of Winter's treatment, and we find as a result of their adoption a preference given to physiological over morphological characters in the criticism of Cohn's classification on the first and second pages. The value of such characters is naturally of the first importance in other ways, but in a botanical classification they are decidedly out of place. Mr. Grove, however, advocates (p. 79) much sounder views in his own treatment of the matter, and in fact, besides labour, he has brought much penetration to the work. Discussing Brefeld's recent extraordinary observations ('Botanische Untersuchungen,' heft v. 1883), Mr. Grove says—"It must be premised that it is impossible to feel much confidence in the results at which he arrives, as he can be convicted of gross carelessness in many parts of his previous work; and the present long and tedious treatise is filled *ad nauseam* with peevish contentious disputations against De Bary and Van Tieghem, and all others who differ from his opinion." Mr. Grove is to be thanked for his good sense and courage in speaking so plainly. At page 77 the author falls into a not unnatural mistake in speaking of the "*recent* victorious establishment of the pleomorphism of the Uredines." Without wishing in the very least degree to detract from the valuable observations of Mr. Plowright, it is only fair to Prof. De Bary to state that this matter was "victoriously established" years ago, and that Mr. Plowright, while now extending our knowledge and fighting a good fight, is, however, as regards the main issue, only slaying the slain.

The illustrations, though somewhat unequal, are yet on the whole very good, and Mr. Grove has done us good service in presenting us with this body of information in so handy a form.

G. M.

A pamphlet, entitled 'The Ferns of York, including also Nidderdale, and the districts around Thirsk, Scarbro', and Whitby,' has been issued by Mr. Sessions, of York, at the price of 6*d*. Mr. H. Ibbotson's name appears as that of the author, but as the editors (Messrs. B. B. Le Tall and A. R. Waller) say that "the part [they] have taken in this work has been to re-arrange and re-write it," it is a little difficult to understand Mr. Ibbotson's connection with the list, which seems a very complete one.

Messrs. C. P. Hobkirk & G. T. Porritt have retired from the editorship of the 'Naturalist,' which they have managed for the last nine years. They will be succeeded by Messrs. W. D. Roebuck and W. E. Clarke.

The recently issued part of the 'Transactions of the Yorkshire Naturalists' Union' contains a Report on Yorkshire Botany for 1880, by Mr. F. A. Lees, and the first part of a paper on the Flora of Ripon and the neighbourhood, by the Rev. H. H. Slater.

Mr. Upcott Gill (170, Strand) is publishing what promises to be a very useful and comprehensive work under the title of 'The

Illustrated Dictionary of Gardening,' in sixpenny parts, of which eight have been already issued. It is copiously illustrated, and the fact Mr. George Nicholson has been entrusted with the revision of the proofs is a guarantee that the literary portion is satisfactorily done. References to good published figures have been added, but the abbreviations of titles strike us as singularly unfortunate—*e. g.*, "A. B. R." = Andrews' Botanist's Repository; "A. G." = Aublet's Histoire des Plantes de la Guyane Française; and so on. Why Mr. Bentham's 'Flora Australiensis' ("B. F. A.") is included in the list we do not know, as it contains no figures.

The second and concluding part of the exhaustive work on 'Die Deutschen Volksnamen der Pflanzen,' by Drs. Pritzel and Jessen, has lately appeared. It consists chiefly of the German popular names arranged alphabetically, with the scientific equivalents of each. — Messrs. Britten and Holland are now completing the Appendix with which their 'Dictionary of English Plant-Names' will conclude; they propose to give a brief bibliography of the subject, and references to little-known books or papers, or additional plant-names, will be gladly received by the Editor of this Journal.

The third edition of Sir J. D. Hooker's 'Student's Flora' has been issued; we hope to notice it at length in an early number.

New Books. — L. Lesquereux & T. P. James, 'Manual of the Mosses of North America' (8vo, pp. v. 447, 6 plates: Boston, Cassino, £1 1*s.* 0*d.*). — A. Hausen, 'Repetitorium der Anatomie und Physiologie der Pflanzen' (8vo, pp. 74: Würzburg). — C. Flagey, 'Flore des Lichens de Franche-Comté,' pt. i. (8vo, pp. 200: Besançon, Marion). — E. H. L. Krause, 'Pflanzengeographische Uebersicht der Flora von Mecklenburg' (8vo, pp. 146: Güstrow, Opitz). — W. Rattke, 'Die Verbreitung der Pflanzen' (8vo, pp. 135: Hanover). — C. de Ficalho, 'Plantas uteis da Africa Portugueza' (Dicotyledons: 8vo, pp. 279: Lisbon).—Imbert-Gourbeyre, 'Récherches sur les Solanum des Anciens' (8vo, pp. 136: Paris, Baillière). — F. Wolle, 'Desmids of the United States' (8vo, pp. 168, tt. 58: Bethlehem, Pa.).

Articles in Journals.

American Naturalist. — J. B. Ellis, 'Notes on Fungi.' — A. F. Foerste, 'Structure and Physiology of *Passiflora lutea*' (illustrated). —Id., 'Flower of *Napæa dioica*.'

Botanical Gazette. — J. Schneck, 'Notes on *Pharadendron flavescens*.'

Bot. Centralblatt (Nos. 27, 28). — H. Mayr, '*Polyporus betulinus* and *P. laevigatus*' (2 plates). — (No. 29). A. Nathorst, 'Zur Tertiärflora Japans.'

Bot. Zeitung (July 4). — A. Koch, 'Ueber den Verlauf und die Endigungen der Siebröhen in den Blättern' (1 plate).—(July 11). E. Fischer, 'Zur Entwickelungsgeschichte der Gastromyceten.'

Bull. Soc. Bot. France (xxxi. pt. 5).—P. Van Tieghem, '*Monascus*, genre nouveau des Ascomycetes.' — Id., 'Sur les canaux

sécréteurs des Liquidambarées et des Simarubacées.' — M. Loret, 'Herborisations aux Pyrénées Orientales.' — L. du Sablon, 'Sur la chute des feuilles marcescentes.' — D. Clos, 'Synonymie des *Androsace diapensioides* et *pyrenaica*, des *Antirrhinum saxatile* et *sempervirens*.' — G. Bonnier, 'Sur les différentes formes des fleurs de la même espèce.' — P. Vuillenim, 'Sur la raccord des systèmes sécréteurs.'—G. Rouy, 'Excursions botaniques en Espagne.'

Flora (July 21). — W. Nylander, 'Addenda Nova ad Lichenographiam europæam.' — H. Karsten, '*Actinomyces* Harz, der Strabenpilz.' — J. Müller, 'Lichenologische Beitrage.'

Gardeners' Chronicle (July 5).—J. G. Baker, 'Notes on Peonies.' — W. G. Smith, *Æcidium Convallariæ* (figs. 2–5). — C. B. Plowright, '*Podisoma Juniperi* & *Ræstelia lacerata*.' — (July 12). *Epidendrum Christyanum* Rchb. f., *Liparis decursivus* Rchb. f., spp. nn. — W. G. Smith, *Fusisporium roseolum* (figs. 7–9). — *Odontoglossum Andersonianum* (figs. 11, 12). — *Papaver umbrosum* (fig. 13). — W. H. Baxter, 'Floriferous sucker of *Agave americana*' (fig. 15). — (July 19). *Oncidium cuspidatum* Rchb. f., sp. n. — *Senecillis carpatica* (fig. 16). — W. G. Smith, '*Peronospora sphæroides* Sm., sp. n.' (fig. 19).— (July 26). *Crinum Sanderianum* Baker, n. sp.— J. Rattray, 'The May Island.' — Id., '*Algæ* of Granton Quarry.'

Knowledge (July 4).—Grant Allen, 'Evolution of Flowers.'

Magyar Növénytani Lapok. (Junə). — A. Kanitz, 'Collectiones Plantarum e quibus Herbarium L. Haynald Cardinalis coaluit.' — (July). J. Schaarschmidt, 'On Continuity of Protoplasts and Protoplasm of the intercellular spores and the middle-lamellary Protoplasm, with special reference to *Loranthaceæ* and *Coniferæ*' (3 plates).

Midland Naturalist. — W. B. Grove, 'On the *Pilobolidæ*.'— J. E. Bagnall, 'Flora of Warwickshire' (*Urticaceæ—Amentiferæ*).

Naturalist.—J. Cash, Early bryological work of W. Wilson.

Nature (July 10). — Fritz Müller, 'Butterflies as Botanists.'— A. Balding, 'Voracity of the *Drosera*.' — (July 24). G. E. Simms, *Utricularia vulgaris* as a fish-catcher.

Œsterr. Bot. Zeitschrift. — L. Celakovsky, '*Polygala supina* and *P. andrachnoides*.' — E. Formánek, 'Flora der Beskiden.' — B. Blocki, 'Flora von Galizien.' — P. Strobl, 'Flora des Etna.'

Pharmaceutical Journal (July 5). — W. R. Dunstan & F. W. Short, 'Chemistry and Botany of the *Strychnos Nux-vomica* indigenous to Ceylon' (illustrated). — (July 12). T. H. Hustwick, 'Note on Tu-tu' (*Coriaria ruscifolia*).— (July 19). E. M. Holmes, 'Lukrabo or Ta-fung-tsze' (*Hydnocarpus anthelmintica* Pierre, sp. n.).

Revue Mycologique. — H. Bonnet, 'Truffes nouvelles' (*Tuber Renati*, *T. lucidum*, *T. piperatum*). — N. Patouillard, 'Du nombre de stérigmates sur le baside.' — C. Roumeguère, 'Les Sphæricées entomogènes.'

Science-Gossip. — W. Roberts, '*Ophioglossum vulgatum* var. *ambiguum*' (illustrated).

Scottish Naturalist.— G. C. Druce, 'Botanical work of G. Don.' — J. Keith, Fungi of Moray. — J. W. H. Trail, 'Species of *Entyloma* parasitic in *Ranunculus*.'

PLANTS FLOWERING IN JANUARY AND FEBRUARY, 1884.

By the Rev. T. A. Preston, M.A., F.L.S.

It may not be entirely without interest to compare a list of plants found in flower during January and February last with that published in this Journal (Journ. Bot. 1882, pp. 161–165) for the same months in 1882. Unfortunately the number of lists supplied to me has fallen off, and the two summaries can hardly be compared as fully as is desirable; but still, as far as the comparison can be made, some interesting results may be gathered.

Lists have been received from Tiverton (Miss M. E. Gill), Yeovil (Rev. J. Sowerby), Croydon (Mr. W. F. Miller), Geldeston (Miss S. S. Dowson), and from Wickham in Essex (Mr. H. N. Dixon). These, with my own list for Marlborough, are the only ones by which any comparisons can be made. Mr. Dixon has also supplied a list for Northampton, and Mr. R. W. Rickards one for Cardiff for January, and one for Findon, near Worthing, for February. These last lists are very remarkable. Mr. Rickards is a very acute observer, and his departure from Marlborough must be the reason why the numbers for this place have fallen off as they have done this year.

The number of species observed are as follows:—

	Jan. 1883.	Jan. 1884.	Feb. 1883.	Feb. 1884.
Tiverton	53	51	53	51
Yeovil	58	47	63	63
Marlborough	50	32	63	96
Croydon	46	45	—	45
Wickham	47	65	—	—
Cardiff	—	87	—	—
Findon	—	—	—	71
Northampton	—	—	—	53
Total No. observed	130	127	121	113

In the January list the most important additions (omitting those from Cardiff) are, from Wickham, *Nasturtium officinale*, *Lepidium campestre*, *Senebiera Coronopus*, *Sarothamnus scoparius*, *Trifolium arvense*, *Carduus palustris*, and *Holcus lanatus*. All these must probably be classed as "survivals." From Croydon, *Senecio sylvaticus*, *Tussilago Farfara*, *Erica Tetralix*, *E. cinerea*, and *Salix* sp. From Tiverton, *Senecio aquaticus* and *Avena fatua*, also "survivals." The *Ribes Grossularia* at Marlborough was a very exceptional specimen.

It is remarkable how very few of the above species can be considered as plants of the year. It has been observed (and probably with truth) that where much growth had to be made plants were not much, if at all, in advance of their average dates, but where this was not the case they were much earlier; and this is to a great extent confirmed by the above list. It must not be understood

that plants were backward in January (for at Marlborough they were about eighteen days in advance of the average of the previous nineteen years), but that the mild winter, which might have been expected to make things very early, has not done so to the extent usually supposed. Among the twenty-four omissions from the January list of last year no less than ten were only found at Yeovil, four only at Tiverton, four at Marlborough, three at Croydon, and three at Wickham. It will be as well to enumerate these omissions, as it will serve to show more clearly how much the differences in the numbers depend on survivals rather than on plants of the year. The list is as follows :—

Alliaria officinalis.
Cardamine sylvatica.
Arabis Thaliana.
Sagina apetala.
Erodium moschatum.
Medicago denticulata.
Vicia hirsuta.
Saxifraga tridactylites.
Chrysosplenium oppositifolium.
Pastinaca sativa.
Daucus Carota.
Torilis Anthriscus.
Cornus sanguinea.
Matricaria Partheñium.
Anthemis Cotula.
Hieracium Pilosella.
Nepeta Glechoma.
Lamium maculatum.
Echium vulgare.
Alopecurus agrestis.
Avena flavescens.
A. elatior.
Dactylis glomerata.
Lolium perenne.

Of the eleven additions to the February list, seven occur in that from Yeovil, and it is in this month that the effect of the warm winter is more particularly visible. The survivals have died out, and the numbers have been fairly maintained by plants of the year. At Marlborough vegetation was about twenty-nine days in advance of its average state. The additions to the February list are :—

Erodium cicutarium.
E. moschatum.
Oxalis Acetosella.
Torilis Anthriscus.
Viscum album.
Senecio aquaticus.
Lathræa Squamaria.
Anagallis arvensis.
Daphne Mezereum.
Salix purpurea ?
Luzula campestris.

The omissions from the list are :—

Ranunculus floribundus.
R. auricomus.
Vicia angustifolia.
Galium Aparine.
Chrysanthemum Leucanthemum.
Matricaria Chamomilla.
Achillea Millefolium.
Senecio Jacobæa.
Veronica Chamædrys.
Lamium incisum.

	JANUARY.	FEBRUARY.
Anemone nemorosa		M., Fin., Y.
Ranunculus hederaceus ..	Car.	
R. acris	Tiv., M., Y., Car.	Fin.
R. repens	Croy., M., Y., Car., W.	Tiv., M., Y.
R. bulbosus	W.	M. [Croy.
R. Ficaria	Tiv., Y., Car., W.	Tiv., M., Fin. ,N., Y., G.,
Caltha palustris	M., Y., Car., W.	Fin., Y.

	JANUARY.	FEBRUARY.
Helleborus viridis	M., Car.	M., Fin., Y.
H. fœtidus	W.	N.
Berberis vulgaris		Fin.
Fumaria officinalis	Croy., Car.	Croy.
Raphanus Raphanistrum ..	Car.	
Sinapis arvensis	Tiv., Croy., Y., Car., W.	Tiv., Croy.
S. alba	Car.	Fin.
Brassica oleracea	Car.	N.
B. Rapa	Y., Car.	Fin.
Sisymbrium officinale	Car.	Fin.
S. Alliaria		Tiv.
Cheiranthus Cheiri	Car.	
Cardamine hirsuta	Tiv., Car., W.	Tiv., Fin., Y., Croy.
Arabis Thaliana		Y.
Nasturtium officinale	W.	
Draba verna	Y., W.	M., N., Y., G., Croy.
Capsella Bursa-pastoris ..	Tiv., Croy., M., Y., Car., [W.	Tiv., M., Fin., N., Y., G., [Croy.
Lepidium Smithii..	Car.	
L. campestre	W.	
Senebiera Coronopus	W.	N.
Viola odorata..	Tiv., Croy., Car.	Tiv., Fin., N. Y., Croy.
V. Riviniana		Tiv., Fin.
V. tricolor		N.
V. arvensis	Croy., Car., W.	Fin.
Polygala vulgaris	Kil.	
Lychnis diurna	Tiv., Y., Car., W.	Tiv., Fin., Y.
Cerastium semidecandrum ..	Tiv.	Tiv.
C. glomeratum	M., Car.	Y.
C. triviale	Tiv., Croy., Y., Car., W.	Tiv., Fin., N., Y., Croy.
Stellaria media	Tiv., Croy., M., Y., Car.,	Tiv., M., Fin., N., Y., G.,
S. Holostea	Tiv., Y., Car. [W.	Tiv., Y. [Croy.
Arenaria trinervia	Tiv., Croy.	Tiv., Fin., N., Y., Croy.
A. serpyllifolia	Croy., Car., W.	Fin., N., Croy.
Sagina apetala		N.
S. procumbens	Car.	
Spergula arvensis	W.	N.
Scleranthus annuus	Car., W.	
Geranium molle	Car.	Fin., Y.
G. dissectum	Car.	Fin.
G. columbinum	Car.	
G. Robertianum	Tiv., Car.	Tiv.
Erodium cicutarium	Y.	Y.
E. moschatum		Y.
Oxalis Acetosella		Y.
Ilex Aquifolium	W. [W.	[Croy.
Ulex europæus	Tiv., Croy., M., Y., Car.,	Tiv., M., Fin., N., Y., G.,
U. Gallii..		Fin.
Sarothamnus scoparius ..	W.	
Trifolium arvense..	W.	
Vicia sepium	Tiv., Y.	
Prunus spinosa	Killarney.	Tiv., Fin.
Poterium Sanguisorba.. ..	Croy.	
Alchemilla arvensis	Car., W.	Fin., N.
Potentilla Fragariastrum ..	Tiv., M., Y., Car., W.	Tiv., M., Fin., Y., G., Croy.
P. reptans	Tiv.	Tiv.
Fragaria vesca	Tiv., Croy., Y., Car.	Tiv., Fin., Y., Croy.
Rubus discolor	Tiv., Car., W.	
Geum urbanum	Tiv. Croy., Car., W.	Tiv., N.
Ribes Grossularia	M.	
Saxifraga tridactylites.. ..		Y.
Chrysosplenium oppositifolium		Tiv., Y.
Pimpinella Saxifraga	M., Y.	

	JANUARY.	FEBRUARY.
Æthusa Cynapium	Car., W.	Tiv., N., Croy.
Angelica sylvestris	Car.	
Heracleum Sphondylium ..	Car., W.	Tiv., Fin., Y., Croy.
Torilis Anthriscus..		Y.
Chærophyllum sylvestre ..	M., Y., Car., W.	Tiv., Fin., N., Y., Croy.
C. temulum	Y., W.	
Scandix Pecten	Tiv., Croy., Car.	Tiv., M., Croy.
Hedera Helix..	Tiv., Croy., Y., Car.	
Viscum album		Y.
Adoxa Moschatellina		M., Fin., Y.
Galium Aparine	Car.	
Sherardia arvensis	Car., W.	Fin., N.
Dipsacus sylvestris	W.	
Carduus crispus		Fin.
C. palustris	W.	
Chrysanthemum segetum ..	Croy., Car.	N., Croy.
C. Leucanthemum	Tiv., Croy., Car. [W.	
Matricaria inodora	Tiv., Croy., M., Y., Car.,	Tiv., M., Fin., N., Y., Croy.
M. Chamomilla	Croy.	
Achillea Millefolium	Y., W.	
Senecio vulgaris	Tiv., Croy., M., Car., W.	all.
S. sylvaticus	Croy.	
S. Jacobæa	Tiv., Croy., Car., W.	
S. aquaticus	Tiv., Car. [W.	Tiv.
Bellis perennis	Tiv., Croy., M., Y., Car.,	all.
Tussilago Farfara..	Croy., Car.	M., Fin., N., Y., Croy.
Petasites vulgaris	M., Car.	M., Fin., Y.
P. fragrans	Tiv., Croy.	
Lapsana communis	Tiv.	Tiv., N.
Hypochœris radicata	Tiv. [W.	
Taraxacum officinale	Tiv., Croy., M., Y., Car.,	all.
Sonchus oleraceus	Tiv., Croy., W.	Fin.
S. asper	Car.	
Crepis virens	Croy., M., Y., Car., W.	Fin., Y.
Erica Tetralix	Croy.	
E. cinerea	Croy., Car.	
Vinca major		Fin., N.
V. minor..	Tiv., M., Y., Car.	Tiv., M., Fin., Y., Croy.
Erythræa Centaurium	Car.	
Scrophularia Balbisii	Car.	
Linaria Cymbalaria	Y., Car., W.	Fin.
Veronica hederifolia	Tiv., Croy., Car., W.	all.
V. polita..	M., Y., Car., W.	M., Fin., N., Y., Croy.
V. agrestis	Tiv., Croy., Car., W.	Tiv., Fin., N., Croy.
V. Buxbaumii	Tiv., Croy., M., Y., Car.	Tiv., M., Fin., N., Y., Croy.
V. arvensis	Tiv., Y., Car.	Tiv., Fin., N., Y.
V. serpyllifolia	Tiv., Car., W.	Fin., Y.
V. Chamædrys	Tiv., Y.	
Lathræa Squamaria		M.
Nepeta Glechoma..		
Stachys arvensis	Car.	Y.
Lamium amplexicaule.. ..	Y., Car., W.	N., Y., Croy
L. purpureum	all.	all.
L. album	all.	all.
L. Galeobdolon		Tiv.
Teucrium Scorodonia	Tiv.	
Myosotis arvensis	Tiv.	Tiv.
Primula vulgaris	all.	all.
P. officinalis		Fin.
Anagallis arvensis..	Car.	Croy.
Rumex obtusifolius	Car.	
Polygonum aviculare	Car.	

	January.	February.
Daphne Mezereum		Fin., N., Y.
D. Laureola	M., Y., Car., W.	M., Fin.
Buxus sempervirens		Fin.
Euphorbia Helioscopia ..	Tiv., Croy., Car.	N., Croy.
E. Peplus	Croy., M., Car., W.	N., Y., Croy.
E. exigua	Car., W.	[W.
Mercurialis perennis	Tiv., Croy., Y., M., Car.,	Tiv., M., Fin., Y.
M. annua		Fin.
Urtica urens	Croy., Y., Car., W.	Fin., N., Y.
Ulmus tuberosa	Croy.	Fin., N., Y., Croy.
U. montana		M., Fin., N., Y., Croy.
Corylus Avellana	all.	all.
Alnus glutinosa	W.	Tiv., N., Y., Croy.
Populus nigra		Tiv., Y.
Salix purpurea		Y.
S. viminalis		M., Fin., N., Y.
S. Caprea	Croy.	Tiv., Fin., Y., Croy.
Taxus baccata	Car.	Fin., N., Y., Croy.
Narcissus Pseudo-narcissus..		Tiv., M., Fin., N.
Galanthus nivalis..	Tiv., M., Y., Car., W.	Tiv., M., Fin., N., Y., Croy.
Ruscus aculeatus	M., Car., W.	M., Fin.
Luzula sylvatica		Fin.
L. campestris..		Y.
Avena fatua	Tiv.	
Holcus lanatus	W.	
Poa annua	all.	Tiv., M., Fin., N., Y., Croy.
P. pratensis	Car.	
Dactylis glomerata		
Bromus sterilis		N.
Brachypodium sylvaticum ..	Y., W.	

ON SOME CRITICAL CHINESE SPECIES OF *CLEMATIS*.

By Francis Blackwell Forbes, F.L.S.

To the student of the Eastern Asiatic species of *Clematis* the 'Conspectus' by M. Maximowicz* has been the best guide since it was published in 1876 with the scrupulous care and judgment which characterise all the writings of that eminent botanist. There were, however, several plants as to which he was obliged to express himself doubtfully, and the present paper is an attempt to throw a little more light on these species, after a study of the types and a comparison of them with other specimens.

Clematis terniflora DC.—The specimen upon which DeCandolle founded this species was gathered by Sir George Staunton in the province of Chekiang, and is now at the British Museum. It had apparently not been seen by Mr. Bentham when he alluded to the species (by a printer's error as *C. ternifolia*) in the 'Flora Hongkongensis,' p. 7, nor by M. Maximowicz when he published his 'Conspectus.' Having come across the type some months ago, I saw that there had been a misapprehension, and I forwarded to M. Maximowicz an excellent drawing made for me by Mr. Morgan.

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* Diag. Plant. Nov. Japon. et Mandsh. Decas xx. Bull. Acad. St. Petersb. xxii. Mel. Biol. ix. 581 *et seq*.

In reply my friend wrote that the plant could not well be the *C. terniflora* of Mr. Bentham and of all other recent authors, himself included. "It has larger and shorter leaflets, and fruits of double the size of Mr. Bentham's plant; and these are distinctly margined, which the fruits of Mr. Bentham's plant are not." Further, while DeCandolle had described the ultimate leaflets as sometimes 3-lobed,* they were never so in the plant recently considered as *C. terniflora*, but in all these particulars the drawing agreed perfectly well with *C. paniculata* Thbg. or with *C. mandshurica* Rupr. Finally, he was inclined to see in the drawing "a form of *C. paniculata*, chiefly on account of its more acute and stronger-margined seeds." M. Maximowicz, in referring *C. mandshurica* Rupr. to *C. recta* L., var. *mandshurica* (*l. c.*, p. 595), had drawn attention to the difficulty of distinguishing its commoner form from *C. paniculata* Thbg. The stem of *C. mandshurica* is herbaceous and subglabrous, while *C. paniculata* is a shrub growing sometimes to the height of twelve feet, with a stem an inch thick, and with the young shoots almost sericeo-pilose. Unfortunately these are differences not always to be observed in herbarium specimens, but, after a critical study of all the sheets of these species with M. Maximowicz's determinations at the Museum and at Kew, I detected one other character which appeared to be constant. In *C. recta* L. var. *mandshurica* the leaf-veins are always impressed above and more or less prominent below, which I also found to be the case with every European specimen of *C. recta* and its varieties in the two herbaria. On the other hand, in the leaves of *C. paniculata* the veins are usually indistinct but never impressed on the upper surfaces, and below they vary from indistinct to prominent. Relying in part on this character, I am disposed to refer DeCandolle's species to *C. recta* L., var. *mandshurica* Maxim., rather than to *C. paniculata*, as M. Maximowicz had suggested.

In his description of *C. terniflora* DeCandolle had taken up the specimen in the Linnean Herbarium, labelled *C. Flammula* var. (!), which is certainly *C. chinensis* Retz. (!). The result was a description of something intermediate between *C. recta* L. var. *mandshurica* and *C. chinensis*, which is just what the distinct plant named *C. terniflora* by Bentham and Maximowicz appears to be. This probably also accounts for the fact that Fortune's specimen A. 89, which is Mr. Bentham's *C. terniflora*, was placed by Mr. Bennett in the British Museum on the same sheet with Fortune's A. 94, which is *C. chinensis*, and that both were bracketed together by M. Maximowicz (*l. c.*, p. 596) under *C. terniflora* DC. The two species, although closely allied, are, however, distinct enough, as will appear from the following descriptions drawn from the types and the other material at my disposal:—

CLEMATIS CHINENSIS Retz.—Ramosa scandens petiolis tortilibus. Ramuli striati, in axillis pubescentes, cetera glabrati. Folia pinnatisecta, 5-nata, 5–6 pollicaria, petiolulis 2–6- (rarissime 10-) linealibus, segmentis 9–15 lin. longis, ovatis v. ovato-lanceolatis

* There are none such now remaining on the type specimen.

mucronatis, basi 3-nerviis, costis supra minute puberulis, cetera glabris, reticulo venarum supra impresso subtus prominulo. Inflorescentia cymoso-paniculata, pedunculis glabris v. passim puberulis, ∞-floris, axillaribus et terminalibus. Sepala 4 oblonga apiculata extus puberula marginibus tomentellis. Achenia 4–5 ovata pilosa caudis longis barbatis. Siccitate caulis ramuli et pedunculi nigri, folia supra nigricantia subtus fusco-purpurea.

Clematis terniflora Benth. (non DC.).—Ramosa scandens petiolis tortilibus. Ramuli striati cum pedunculis, præsertim statu juvenili, pubescentes. Folia pinnatisecta 5-nata, petiolulis 1–1½ pollicaribus, segmentis late ovatis v. subcordatis acutis 1½–2 poll. longis 1–1½ poll. latis, basi 5–7 nerviis, utrinque parce pubescentibus, reticulo venarum supra distincto subtus prominulo. Inflorescentia cymoso-paniculata, axillaris et terminalis, pedunculis ∞-floris. Sepala patentia circ. 4-linealia oblonga 3-nervia intus glabra extus pubescentia marginibus tomentosis. Stamina circ. 32 inæqualia glabriuscula, antheris filamenta æquantibus v. iis longioribus. Achenia 4 ellipsoidea adpresse pubescentia caudis longiusculis barbatis. Folia siccitate sordide et obscure brunnea.

These two species when dried present differences in their degree of "blackening" which, though sensible enough, are hard to define in words. The leaves of *C. chinensis* are much the darkest, and the black is modified by a sort of deep maroon lustre; while those of *C. terniflora* are of a dull brown colour and of a coarser texture. I may also mention that I have found all the latter curiously pitted, as if from the attacks of some insect, but I have not observed the same thing on any specimen which I have attributed to *C. chinensis*.

On the type-sheet of *C. chinensis* in the British Museum is a scrap from Lord Macartney's collections at Whampoa, which resembles this species in many respects, but, from the larger size and the pubescence of its fruits, seems more likely to have come from an upper branchlet of a form of *C. recta*. The specimen is, however, too scant for satisfactory determination.

M. Maximowicz (*l. c.*, p. 596) suggests that *C. minor* Lour. may be identical with *C. chinensis*. Last April, when in Paris, I was shown the small bundle which contains what the Museum possesses of Loureiro's herbarium. The sheet labelled *C. minor* in DeCandolle's handwriting comprised a few scraps laid end to end, and, as some were only of a single internode and some were placed upside down, the first effect of the *ensemble* was, to say the least, very quaint. I could see nothing in the specimens to distinguish them from *C. chinensis*, but there is no evidence to show that they were Loureiro's type of his *C. minor*.

Clematis heracleifolia DC.—The identity of this species with *C. tubulosa* Turcz. (*C. stans* Sieb. & Zucc.), suspected by M. Maximowicz (*l. c.*, p. 590), is established beyond doubt by the type in the British Museum (!). The plant gathered in Shantung by Maingay (106 in Herb. Kew !), and others collected by myself at Chefoo in the same province, approach more nearly the type of *C. stans* S. & Z., which, however, cannot be specifically separated. *C. Davidiana* Dcne., which has been cultivated in the Botanic Gardens

at St. Petersburg, Paris, and Kew, is referred by M. Maximowicz (*l. c.*, p. 589) to Turczaninow's species; but Sir Joseph Hooker informs me that he is inclined to suspend his judgment on this point till he has seen the plants longer in cultivation. In its wild state in North China it is described by M. Maximowicz as "Planta valde variabilis, caule mox herbaceo graciliore, mox basi lignoso suffruticoso in ramos plures erectos diviso. Flores mox *in axillis foliorum fasciculati sessiles*, mox pedunculo communi fulti, alii sessiles, alii pedicellati, mox flores sessiles cum pedicellatis in axilla eadem intermixti, mox pedunculus elongatus ad intervalla fasciculis pluribus florum onustus." The words which I have italicised represent the form which is known as *C. Davidiana*. Furthermore, Turczaninow's species has evidently been the foundation of many constructed on cultivated forms by M. Decaisne and others, which are not likely to stand very long. Without enumerating them all, it may suffice to quote M. Franchet's account of the origin of one :—

"*C. Savatieri* Dcne.*—A species established on one-half of a plant. This may seem strange, but it is none the less true. In 1877 I separated into two parts the root of a *C. stans* S. & Z., grown from seed sent me from Japan by Dr. Savatier. One part of the plant remained at Cheverny; the other I sent to the Museum, and it may now be seen in the Botanic Garden where it was planted. It was from this portion, cultivated in Paris, that M. Decaisne thought he could draw sufficient characters to distinguish his *C. Savatieri*."

M. Franchet goes on to speak of the influence of climate and position on the natural variability in the growth of *C. stans*, and insists that there was really nothing to distinguish *C. Savatieri* beyond the shortness of the peduncles. Granting, however, that the habit of the plant grown at the Museum was remarkable enough to mislead a describer, he deprecated drawing conclusions from a single specimen without taking into account the observations of those who had observed the species in its native country and under all its forms. For, as he adds, "while *one half* of the plant cultivated at the Museum exhibits a panicle reduced to the smallest proportions, the *other half*, in the garden of Cheverny where it was raised, has remained a true *C. stans*, developing at the end of the summer of 1880 panicles from 20 to 30 centimetres in length."

The following gives the synonymy of the four species, and a list of the herbarium specimens examined :—

Clematis recta L., var. *mandshurica* Maxim. in Mel. Biol. ix. 594. — *C. mandshurica* Rupr. inPlant. Maack. in Bull. Petersb. xv. 514. — *C. terniflora* DC. Syst. i. 137, et *C. tenuiflora* (sphalmate) DC. Prod. i. 3, excl. spec. *C. Flammulæ* var.

Hab. Chekiang (Staunton in Herb. Mus. Brit. spec. typ. *C. ternifloræ* DC.). Chinkiang (Maries, Herb. Kew). Shingking (Ross 559, Herb. Kew). Fengwangshan prope Shanghai (Martin, Herb. propr.).

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* Translated from the Bull. Soc. Linn. Paris, No. 38, Séance Nov. 2, 1881, p. 298.

C. CHINENSIS Retz. Obs. Bot. ii. 18, No. 53. — *C. sinensis* Lour. ex DC. Syst. i. 137. —*C. terniflora* DC. quoad spec. *C. Flammulæ* var. in Herb. Linn.; Maxim. in Mel. Biol. ix. 596. quoad spec. Fortune A. 94.

Hab. China (Bladh in Herb. Mus. Brit. spec. typ.; Baird.). Amoy (Fortune A. 94 in Herb. Mus. Brit. et Kew; Hance, No. 1476 in Herb. Kew). Formosa (Swinhoe 54 in Herb. Kew).

C. TERNIFLORA Benth. Fl. Hongkong. p. 7 (sphalmate *C. ternifolia*) (non DC.); Maxim. in Mel. Biol. ix. 596, pro parte.

Hab. Amoy (Fortune A. 89 in Herb. Mus. Brit. et Kew). Ningpo, flor. (Herb. propr.). Ins. Pootoo, fruct. (Carles, Herb. propr.).

C. HERACLEIFOLIA DC. Syst. i. 138.—*C. tubulosa* Turcz. in Bull. Mosc. 1837, x. 148. — *C. stans* S. & Z. Fl. Jap. Fam. Nat. i. 302, et *C. Davidiana* Dcne. ex Maxim. in Mel. Biol. ix. 588–9.

Hab. Inter Peking et Jehol (Staunton in Herb. Mus. Brit. spec. typ.). In ditione Pekinense (Mollendorff ex Herb. Hance 13474; Tatarinow, Bretschneider in Herb. Kew) (Bretschneider in Herb. Mus. Brit.). Shantung (Maingay 106 in Herb. Kew). Chefoo, prov. Shantung (ipse legi).

NOTES ON DORSET PLANTS.

By the Rev. W. Moyle Rogers, F.L.S.

The following notes are supplementary to some others on the same subject which I contributed to this Journal in May, 1880. In both papers the localities named are additional to those given in the 'Flora of Dorset,' and are so arranged as to fit in with the plan of that work,—the capital letters before them representing the several districts into which Mr. Mansel-Pleydell has divided the county. The records all date since 1879. Indeed, with very few exceptions, they belong to 1883 and 1884, having been made by me during a few weeks' stay in the county in the course of the last two summers. The country chiefly explored is that in the neighbourhood of Ryme, Evershot and Dorchester, — a tract of varying width from the northern border near Yeovil Junction to Weymouth, through the middle of the county. Except in the very few instances where the name of the finder will be given (in italics), all the plants have been seen by me in the places named. In every case where I have not seen the plant growing, I have received fresh specimens from the person on whose authority the locality is given.

As on many previous occasions, I am much indebted to Prof. C. C. Babington, Mr. J. G. Baker and Mr. T. R. Archer Briggs, for kindly examining some of my specimens and helping me to name them.

Ranunculus auricomus L. B. Roadsides between Ryme and Yetminster, and between Ryme and Melbury, but very local. — *R. hirsutus* Curt. C. Upway, in coarse pasture east of the railway

station ; abundant.—*R. parviflorus* L. B. Ryme, on the Melbury Road for a short distance. — *R. arvensis* L. B. Ryme, in a cornfield by the Yetminster Road, in great quantity, 1883.

Aquilegia vulgaris L. C. Hill a few minutes' walk out of Maiden Newton (to the east); one plant, 1884.

Berberis vulgaris L. B. Ryme. C. Frampton. Planted, I think, in both places.

Papaver Argemone L. C. Railway bank near Dorchester, two or three plants together, 1884.

Chelidonium majus L. B. Ryme. Chetnole. I have not seen it in District C.

Sinapis nigra L. C. Upway. Lodmoor.

Cardamine flexuosa With. B. Ryme. Chetnole. C. Ailwell. Evershot. Rampisham.

Lepidium Smithii Hook. C. Lane near Wareham railway station.

Senebiera didyma Pers. C. Dorchester, near the amphitheatre.

Reseda lutea L. C. Roadside bank near Black Down, in the Dorchester and Bridport Road. Railway banks near Upway. —*R. Luteola* L. C. By the Frome near Dorchester.

Viola hirta L. B. Ryme. Bubb Down. C. Evershot. Yellowham Wood.—*V. Reichenbachiana* Bor. C. Frampton. — *V. lactea* Sm. C. Moreton Heath; in flower and fruit, but apparently in small quantity.

Polygala oxyptera Reich. C. Bank about midway (by fields) between Evershot and Rampisham : in no great quantity. Poundbury and Maiden Castle, abundant. G. Grassy slope from Corfe Castle to the road. Dr. F. Arnold Lees has kindly examined and confirmed my naming of the Poundbury plant, with which those at Maiden Castle and near Evershot appear to me identical. But in both *P. oxyptera* Reich. and *P. depressa* Wender., I can see only varieties of *vulgaris*.—*P. depressa* Wender. C. Evershot. Moreton Heath. Typical *vulgaris* seems fairly common.

Cerastium semidecandrum L. C. In short turf on ground a little to the south-east of Wareham railway station.

Sagina apetala L. C. Evershot. Dorchester.—*S. ciliata* Fries. C. Near Wareham railway station.—*S. subulata* Wimm. C. Moreton Heath.

Spergularia rubra Fenzl. C. Moreton Heath. Near Wareham railway station.—*S. neglecta* Syme. C. Lodmoor.

Scleranthus annuus L. C. Moreton Heath; the only place in Dorset where I have seen it.

Montia fontana L. C. With the last.

Hypericum Androsæmum L. C. Fairly frequent about Evershot, and between Evershot and Rampisham. — *H. humifusum* L. C. Evershot. Moreton Heath. Puddletown Heath.—*H. hirsutum* L. B. Ryme, Leigh, &c., very common. C. Near Evershot. Yellowham Wood.—*H. elodes* L. C. Moreton Heath. Puddletown Heath.

Radiola Millegrana Sm. C. Puddletown Heath.

Geranium pusillum L. C. Lane near Wareham railway

station.—*G. columbinum* L. B. Ryme. C. With the last. — *G. lucidum* L. B. Ryme, common. Chetnole. C. Evershot, in small quantity. Like *G. columbinum*, decidedly local in Districts B. and C.

Rhamnus catharticus L. B. Ryme. E. Bailey Ridge. — *R. Frangula* L. C. Puddletown Heath; one large tree near the middle.

Genista tinctoria L. B. Ryme and Chetnole; rough pastures; locally abundant. C. Field at back of Lodmoor. E. By Bailey Ridge.

Sarothamnus scoparius Koch. C. Near Evershot, &c.; quite frequent.

Anthyllis Vulneraria L. C. Near Evershot railway station. Frampton. Moreton Heath.

Medicago maculata Sibth. C. Lane near Wareham railway station.

Trigonella ornithopodioides DC. C. In the turf of the unenclosed gronnd at the east end of the same lane; apparently in small quantity.

Trifolium subterraneum L. C. With the last; common. — *T. medium* L. B. Ryme. C. Evershot.—*T. arvense* L. C. Moreton Heath. — *T. striatum* L. C. In the station given above for *Trigonella*, &c.—*T. scabrum* L. G. About Corfe Castle, and on the heaths near, in immense quantity.—*T. glomeratum* L. C. In the lane near Wareham railway station, and in the ground beyond; abundant. — *T. suffocatum* L. C. With the last, on the turfy mounds beyond the lane; in good quantity, but nearly bnrnt up on June 21st, 1884. New record for the county.—*T. hybridum* L. B. and C. Becoming quite common, as in south-west England generally.—*T. fragiferum* L. B. Yetminster. Chetnole. South-west corner of Melbury Park, common. — *T. filiforme* L. B. Leigh. C. Near Wareham railway station.

Ornithopus perpusillus L. C. With the last.

Lathyrus Nissolia L. B. Elsford Hill (perhaps the same as Prof. Buckman's station in Fl. Dors., "between Ryme and Closworth"). C. Lodmoor.

Orobus tuberosus L. B. Chetnole. C. Evershot.

Prunus insititia L. C. Evershot. Rampisham. Near Lodmoor. — *P. Cerasus* L. C. Near Evershot.

Agrimonia odorata Miller. C. Border of Yellowham Wood (west side); several very large plants.

Alchemilla vulgaris L. C. Evershot; in marshy pasture south-east of school, in fair quantity. Rare in south-west England. Here (as Mr. W. Bowles Barrett, to whom I gave a specimen, has pointed out to me), it is var. *montana* Willd.

Potentilla argentea L. C. In the lane south-east of Wareham railway station, and in the open ground beyond.

Rubus Idæus L. C. Ailwell. Evershot. Moreton Heath. — *R. affinis* W. & N. C. In the lane with *Potentilla argentea*. — *R. Lindleianus* Lees. B. Leigh. C. Evershot. Rampisham. Yellowham Wood. Puddletown Heath. Locally abundant. — *R. rhamnifolius* W. & N. C. Evershot; common.

Rampisham. Puddletown Heath border. In the lane near Wareham railway station. E. Bailey Ridge; common. — *R. discolor* W. & N. B. and C. Generally distributed and locally common. E. Bailey Ridge. — *R. leucostachys* Sm. C. Near Evershot and Weymouth. E. Bailey Ridge. Apparently local. *R. villicaulis* W. & N. C. Evershot. Rampisham. — *R. umbrosus* Arrh. C. Evershot. Rampisham. Puddletown Heath. Near Lodmoor. E. Bailey Ridge. Locally abundant, but hardly so common as in Devon. — *R. macrophyllus* W. & N. C. About Evershot. — *R. Borreri* Bell Salt. C. Black Down; in considerable quantity, but only in bud when I saw it. What is probably a luxuriant form of this occurs in considerable quantity on the borders of Yellowham Wood and Puddletown Heath, and near Wareham railway station.—*R. approximatus* Quest. C. Near Evershot. I am indebted to Prof. Babington for thus naming a bramble which I found (I think in no great quantity) on the Rampisham Road, about one mile from Evershot, in August, 1883. He places it under *R. Hystrix* Weihe.—*R. Radula* Weihe. B. Near Evershot. Near Wareham railway station. Remarkably local.—*R. diversifolius* Lindl. C. Near Evershot. Dorchester and Wareham railway station; rather frequent. Maiden Newton. Yellowham Wood. — *R. glandulosus* Bell. C. Near Evershot, on the Beaminster Road; abundant and very luxuriant. — *R. corylifolius* Sm. B. Ryme. C. Evershot. Rampisham. Frampton, &c., common. Especially abundant about Weymouth.—*R. tuberculatus* Bab. C. Evershot. E. Bailey Ridge.—*R. cæsius* L. B. Ryme. C. Evershot. Very local. The foregoing Rubi records may, I believe, be quite relied on. The following additional ones I feel more or less doubtful about. — *R. calvatus* Blox. C. Near Evershot. — *R. fusco-ater* Weihe. Mr. Briggs is disposed so to name a beautiful glandulous bramble which I found early in last July (only just coming into flower), in a sunny field-hedge between Evershot and Rampisham, and in great quantity (some twelve or fifteen miles to the south east in the same District C.) about Yellowham Wood and Puddletown Heath.—*R. Balfourianus* Blox. B. Leigh. C. Evershot. — *R. althæifolius* Host. C. Near Wareham railway station.

Rosa tomentosa Sm. (aggregate). B. Ryme. Leigh. C. Near Evershot and near Dorchester, but uncommon. Near Weymouth; in one place shown me by Mr. W. B. Barrett. — *R. scabriuscula* Sm. C. Near Evershot; in one place. New record.—*R. sylvestris* Lindl. C. About half-way (by fields) between Evershot and Rampisham. New record. — *R. micrantha* Sm. B. Leigh; rather frequent. Ryme. C. Evershot; uncommon. Between Evershot and Rampisham; in one place. Near Weymouth. — *R. canina* L. — *R. lutetiana* Leman. B. Leigh. C. Near Evershot, Rampisham, Dorchester and Weymouth, fairly frequent. — *R. sphærica* Gren. B. Chetnole and Leigh, in several places. Some of the bushes, with rather smaller leaves and fruit, growing between Chetnole and Melbury, which I had placed here, Mr. Baker seems inclined to put under *R. senticosa* Ach., but they appear to me to

differ very slightly (if at all) from a Leigh bush which M. Déséglise has named *sphærica*. — *R. dumalis* Bechst. Far the commonest "dog-rose" in Dorset, as in south-west England generally.—*R. biserrata* Mérat. B. Ryme and Chetnole, but rare. C. Near Evershot railway station, in one place. New record.—*R. urbica* Leman. B. Ryme. C. Near Evershot and near Dorchester. E. Bailey Ridge. In such parts of the county as I have explored common nowhere but near Chetnole (B).—*R. frondosa* Steven. C. Near Evershot. E. Bailey Ridge. Name confirmed by Mr. Baker in both cases. New county record. — *R. arvatica* Baker. C. By the Frome near Dorchester, July, 1884, in small quantity and hardly typical. In 1880 Mr. W. Barrett sent me a good example of this, gathered by him near Weymouth,—the first found in the county, I believe. — *R. obtusifolia* Desv. B. Ryme. C. Near Wareham railway station. E. Bailey Ridge.—*R.? dumetorum* Thuill. B. Chetnole and Leigh. Of a Leigh specimen that I sent to Mr. Baker he says: "This looks very like the north country *dumetorum*, so far as one can judge from flowering specimens." I have not seen it in fruit. E. Holwell. Name confirmed by M. Déséglise, but dissented from by Mr. Baker. I do not find *dumetorum* in Devon. — *R. tomentella* Desv. B. Chetnole. Only found once. — *R. andegavensis* Bast. C. Between Evershot and Rampisham (by fields), several very large bushes. Upway, in good quantity. Near Lodmoor.—*R.? verticillacantha* Mérat. C. Evershot; one or two bushes. Merely *R. dumalis* with a few setæ (sometimes only two or three) on each peduncle; very unlike the much more glandular *R. aspernata* Nob., which is the usual and quite frequent representative of *verticillacantha* in the lower part of the Teign valley, South Devon.—*R. systyla* Bast. B. and C. Common. E. Bailey Ridge. — *R. Desvauxii* Baker. D. Lane between Yellowham Wood and Puddletown; two or three very luxuriant bushes together. Confirming my name for this, Mr. Baker adds, "more hairy than I have ever seen it before." New county record.—*R. virginea* Rip. B. Leigh; hedges in "the drove," in two or three places. E. Bailey Ridge; about one mile from the District B. locality. A handsome well-marked rose with white cup-shaped flowers on rather shorter peduncles than are usual in the Stylosæ group, and glabrous, deeply-toothed leaflets. It is identical with the one referred to (under *R. systyla*) in my 'Contribution to a Flora of the Teign Basin' (Journ. Bot. 1882, page 263), and was first recorded for Great Britain from "Wood near Horsebridge, S. Hants, Aug. 1876," by Mr. H. Groves (*vide* Report B. E. C., 1878). New county record for Dorset and Devon. —*R. arvensis* Huds. B. & C. Fairly common.—*R. bibracteata* Bast. B. Ryme and Leigh; not very uncommon. C. Evershot. Weymouth. A form like *bibracteata* in most respects, but with ovate fruit and very pinnate sepals, which I have found at Ryme and Chetnole, M. Déséglise has named *R. ovata* Lej.

Epilobium angustifolium L. C. On railway banks near Dorchester, in good quantity, July, 1884. Denizen. — *E. roseum* Schreb. C. Evershot; an abundant weed in kitchen garden, and

in good quantity in damp shady lane at the back of the garden. Rampisham; a garden weed. August, 1883. New county record. I am not quite satisfied that this is a true native of Dorset. At Evershot I have seen it again this summer in good quantity in both lane and kitchen-garden. The Rampisham locality I did not again examine. Elsewhere in the county I have searched for it in vain; so I cannot help suspecting that it may prove only a colonist. Last year I found it in plenty at Limpley Stoke in South Wilts, a vice-county only doubtfully credited with it in 'Topographical Botany.' In Devon I have myself only seen it once, and that a single plant, in Exeter.—*E. tetragonum* L. B. Ryme. C. Moreton Heath. Upway. Apparently not nearly so common in District C. as in B.—*E. obscurum* Schreb. C. About Evershot and Rampisham, frequent. Frampton. Moreton Heath. Yellowham Wood.

(To be continued.)

PERTHSHIRE PLANTS AND 'TOPOGRAPHICAL BOTANY.'

By F. Buchanan White, M.D., F.L.S.

Following the example of my friends Prof. Trail and Mr. Roy, I have gone carefully over the 2nd edition of 'Topographical Botany,' the result of which is that a good many additions and a few corrections can be made to the records of Perthshire plants. In the expectation that the Flora of Perthshire will soon be published, it has been thought unnecessary to take up space with locality-names, or with the names of authorities for the localities or for the authenticity of the "critical species.'

Many of the records now made might have been included in 'Topographical Botany' had the material collected for the Flora of Perthshire been worked out in time, but a few of them are recent discoveries. It is scarcely necessary to say that W.= west, M. = Mid, and E. = East Perth.

Thalictrum minus. Aggr. E.
T. montanum. M. & E.
Ranunculus aquatilis. Aggr. M. & E.
R. heterophyllus. M. & E.
R. peltatus. M. & E.
R. trichophyllus. M. & E.
R. Drouetii. M. & E.
R. penicillatus. M. & E.
R. confusus. E.
R. circinatus. W., M. & E.
R. Lingua. E.
R. auricomus. E.
R. sceleratus. M. & E.
R. arvensis. E.
Helleborus fœtidus. M. Naturalised in one place, where it is said to have been sown many years ago. Occasionally as an outcast in E.
Aconitum Napellus. M. & E. Planted, or an escape in several spots, but cannot be said to be naturalised.
Berberis vulgaris. Always planted, I think.
Nymphæa alba. M. & E.
Nuphar luteum. W. & M. (By error the figures 88 are affixed to E, in Top. Bot. ed. 2. The same remark applies to N. intermedia.)

Nuphar "pumilum." E.*
Papaver Argemone. E.
P. Rhœas. M. & E.
Corydalis claviculata. E.
Fumaria capreolata (Agg.). E.
F. pallidiflora. E.
F. Boræi. M. & E.
F. confusa. E.
F. micrantha. E.
Thlaspi arvense. E.
T. alpestre. M. & E.
Teesdalia nudicaulis. E.
Lepidium campestre. M. & E.
Subularia aquatica. E.
Draba incana. W. & E.
Cardamine amara. E.
C. sylvatica, M.
Arabis petræa. Though Lightfoot figures the true plant, it was either never found, or (what is less likely) has disappeared from the Perthshire locality given by him. I discovered it, however, on another Perthshire hill — Ben Laoigh.
Turritis glabra. M. Doubtfully native.
Barbarea vulgaris. E.
Nasturtium terrestre. M.
N. sylvestre. M.
Sisymbrium Sophia. M. Rare casual.
Viola Reichenbachiana. M.
Drosera anglica. E.
Polygala oxyptera. The record for M. requires verification.
P. depressa. W.
Silene anglica. Record for M. requires verification.
Lychnis Viscaria. M.
L. Githago. M.
Spergularia rubra. E.

* I retain the name "*pumilum*" for this small-flowered *Nuphar*, since that name has been used for our plant by several competent botanists, and the specimens have been distributed under that name by the Exchange Club. If it is the real *pumilum*, all that can be said just now is that the description in our books requires considerable alteration. Our plant is apparently not *intermedium* Ledeb.

Arenaria rubella. E.
Hypericum Androsæmum. W.
Erodium cicutarium. W.
Geranium pyrenaicum. Certainly an escape.
G. pusillum. "88 Perth mid (F. B. White)" is erroneous. I have never seen or heard of the species in Perthshire.
G. columbinum. E.
Medicago lupulina. M.
Melilotus officinalis. M. & E.
M. vulgaris. M. Neither have any claim to be more than casuals.
Trifolium arvense. M.
Astragalus glycyphyllus. M.
A. hypoglottis. M.
Oxytropis uralensis. M.
Ornithopus perpusillus. E.
Vicia Orobus. E.
V. lutea. Light is required on the record "Perth mid?"
Lupinus perennis. M. & E. Very abundant in some localities.
Lathyrus Aphaca. Casual in
Prunus Padus. M. [M. & E.
P. avium. E.
Potentilla procumbens. M. & E.
P. reptans. W.
Rubus suberectus. M. & E.
R. fissus. W. & M.
R. plicatus. E.
R. affinis. M. & E.
R. hemistemon. M.
R. rhamnifolius. M.
R. latifolius. E.
R. hirtifolius M.
R. villicaulis. M.
R. adscitus. M.
R. macrophyllus and *var.* umbrosus. M.
R. Hystrix. E.
R. Radula. E. [M.
R. Kœhleri. M. *Var.* pallidus.
R. Lejeunii. M.
R. Balfourianus. E.
R. corylifolius. M. & E. *Var.* conjungens. E. *Var.* purpureus.
R. tuberculatus. M. [E.
R. cæsius. If this is a Perthshire species it must be very

local. I have no record of its occurrence.
Rosa spinosissima. M. & E.
R. hibernica. M.
R. Sabini. E.
R. tomentosa. M. & E.
Agrimonia odorata. In several widely separated localities in M. Native?
Poterium muricatum. Formerly in E., but now extinct by destruction of the locality. I suspect that the record for E. in Top. Bot. for *P. Sanguisorba* is founded on the above-mentioned station for *P. muricatum*, specimens from which have been several times reported as belonging to *P. Sanguisorba*, which does occur in E. Perth, though I am rather inclined to doubt its being native.
Pyrus acerba. W., M. & E.
Epilobium eu-tetragonum. Requires verification as a Perthshire plant.
Circæa lutetiana. E.
C. alpina. E.
Myriophyllum spicatum. W.
Callitriche autumnalis. M.
Herniaria glabra. A garden plant only in Perthshire.
Sedum Telephium. All the specimens I have seen belong to *S. Fabaria*.
S. anglicum. Widely spread and quite native in M.
Saxifraga nivalis. W.
S. tridactylites. W. (still there?)
Hydrocotyle vulgaris. E.
Sanicula europæa. E.
Conium maculatum. M. Doubtfully native.
Helosciadium inundatum. M.
Pimpinella magna. I think this is only a naturalised plant in W.
Æthusa Cynapium. M. & E. Probably introduced in many places.
Daucus Carota. W.
Scandix Pecten-Veneris. M.
Viscum album. Does not now apparently exist (except in gardens) in E.
Sambucus nigra. E. A doubtful native in Perthsire.
Linnæa borealis. E.
Galium erectum Huds. Plants that seem better referred to this subspecies than to *G. Mollugo* occur in M. & E. Some others seem to be intermediate between the two.
Dipsacus sylvestris. "west" after "Perth" is a typographical error. The plant is very local, possibly introduced.
Leontodon hirtus and L. hispidus. Both of these require verification as Perthshire plants.
Sonchus asper. E.
Hieracium holosericeum. E. seems to be an error. The locality, though close on the boundary, is in M.
H. nigrescens. E.
H. chrysanthum. M.
H. murorum (Segr.). M. & E.
H. cæsium. M. & E.
H. gothicum. M. & E.
H. iricum. M. & E.
H. prenanthoides. E.
H. tridentatum. M.
Of *H. umbellatum* and *H. boreale* there are no trustworthy records for their existence as Perthshire plants.
Arnoseris pusilla. Has occurred in M., but not recently.
Serratula tinctoria. M. Introduced?
Carduus nutans. E.
C. crispus. M. & E. Local, but apparently native.
Centaurea Cyanus. W.
Bidens cernua. M. & E.
B. tripartita. M. & E.
Petasites vulgaris. W.

Senecio viscosus. M. & E., but doubtless an introduction.
Inula Conyza. One or two stray specimens have occurred in E., but the plant has not become naturalised. I mention this only because [89] is given under this species in Top. Bot.
Campanula rapunculoides. M., but as usual, merely a casnal.
Lobelia Dortmanna. E.
Arbutus alpina. There is no evidence of this being a Perthshire plant, now or at any time. Does not the "Perth mid?" refer to the old record of the plant having been found near Loch Treig, which, though near Perthshire, is in Invernesshire?
Vaccinium uliginosum. E.
V. Oxycoccos E.
Pyrola media. E.
P. minor. E.
P. uniflora. "Perth mid." is, I think, founded on an erroneous record, the E. Perth station being intended. Scone is in "89 Perth east." The plant is now very rare there, and it is hoped that botanists will not take roots of it.
Ligustrum vulgare. Always planted, so if M. is admitted, W. & E. have equal claims.
Fraxinus excelsior. W. Native.
Vinca minor. M. & E., but only where originally planted.
Gentiana Amarella. M. Perhaps also in E.
Erythræa Centaurium. M. & E.
Convolvulus arvensis. W., M. & E.
Verbascum Thapsus. E.
V. nigrum. Casual in E.
Veronica Anagallis. M. & E.
V. montana. M. & E.
V. polita. M, & E.
V. Buxbaumii. E.
Melampyrum sylvaticum. W.
Linaria repens. E. (Naturalised on an old wall).
L. vulgaris. W. & E.
Orobanche major. The "Perth?" is, I suppose, founded on an old record of this species having been found at Methven. I am nearly certain that *Lathræa* was mistaken for it.
Lathræa Squamaria. M. & E.
Mentha sylvestris. M.
M. piperita. M. & E.
M. aquatica. W.
M. sativa. M. & E.
Origanum vulgare. E.
Calamintha Acinos. M. & E.
Lamium album. M.
L. amplexicaule. E.
L. incisum. W., M. & E.
Galeopsis Ladanum. E.
Betonica officinalis. M.
Stachys ambigua. M.
S. arvensis. M.
Glechoma hederacea. E.
Scutellaria galericulata. W. & E.
Myosotis palustris. W. & M.
M. collina. M. & E.
Lithospermum arvense. M. & E.
Symphytum officinale. M.
S. tuberosum. M. & E. Both species of *Symphytum* are probably introductions, but *S. tuberosum* is much more abundant, and may possibly be native.
Cynoglossum officinale. M. & E.
C. sylvaticum. E. I am rather inclined to think this is native.
Echium vulgare. M. & E. Probably native, but not in all the localities.
Utricularia vulgaris. M. & E.
U. intermedia. M. & E.
U. minor. M. & E.
Primula veris. W., M. & E. Though somewhat local, this is often very abundant and undoubtedly native.
Lysimachia Nummularia. E. Perhaps an introduction.

Anagallis arvensis. E.
A. tenella. M.
Centunculus minimus. W. & E.
Glaux maritima. E.
Armeria maritima. E.
Plantago media. W., M. & E.
Casual on old lawns.
P. Coronopus. E.
Littorella lacustris. E.
Chenopodium Bonus-Henricus. M. & E., but scarcely indigenous.
Obione portulacoides. E. was probably recorded in error. We know nothing of the plant in Perthshire now.
Atriplex Babingtonii. E.
A. angustifolia. W. & M.
Polygonum Bistorta. M. & E., but only as an outcast.
P. lapathifolium. E.
P. Persicaria. E.
P. Hydropiper. E.
P. minus. M. & E.
Rumex Hydrolapathum. E.
R. conspersus. M.
R. pratensis. M. & E.
R. nemorosus. E.
R. conglomeratus. E.
Betula verrucosa. M. & E.
B. glutinosa. M.
Salix alba. M. & E. Planted?
S. triandra. E. Planted?
S. undulata. M. Planted?
Juniperus nana. M. & E.
Epipactis palustris. By a typographical error, "Perth mid." is given for "Perth east," though the numerals are correct.
Cephalanthera grandiflora. In the M. station for which this was recorded we can find *C. ensifolia* only.
Corallorhiza innata. E. It was a few years ago, and probably is yet, existent in M., though queried as "extinct?"
Iris Pseudacorus. E.
Narcissus Pseudo-narcissus. M. Naturalised.
Polygonatum verticillatum. I do not understand the remark, "uncertain native." With us it appears to be as undoubtedly native as any plant we have. It occurs in about seven distinct stations, along a line about thirty miles long.
Tofieldia palustris. W.
Butomus umbellatus. Probably native in M.
Scheuchzeria palustris. I fear that this is probably extinct at Methven, owing to the altered conditions of the locality.
Potamogeton filiformis. M.
P. zosterifolius. This requires verification as a Perthshire plant. We have not been able to find a trace of it in E., for which it is recorded.
P. decipiens. M.
P. Zizii. I do not know why this is given as a plant of W. on my authority. It is not uncommon in E., but I have no record of it from W.
P. natans (segr.). W.
Zannichellia palustris. M.
Lemna minor. M. & E.
Arum maculatum. M. & E.
Introduced.
Sparganium minimum. W. & M.
S. simplex. M. & E.
S. ramosum. M. & E.
Typha latifolia. M. & E.
Juncus cænosus (Gerardi). E.
J. trifidus. E.
Luzula pilosa. E.
L. congesta. E.
L. arcuata. Extremely doubtful as a Perthshire plant. I do not know on what grounds it is admitted even with a "?"
Scirpus lacustris. W.
S. maritimus. E.
S. fluitans. W. & E.
Eriophorum latifolium. M.

Carex pauciflora. W.
C. curta. E.
C. teretiuscula. M.
C. paniculata. E.
C. limosa. By a typographical error, "west" is given for "east," though the numerals are correct.
C. sylvatica. M. & E.
Agrostis canina. E.
Phragmites communis. E.
Catabrosa aquatica. M. & E., but no very recent records of its occurrence.
Glyceria aquatica. E.
G. plicata. E. Perhaps extinct.
Festuca sciuroides. E.
Bromus asper. E.
Brachypodium sylvaticum. E.
Polypodium calcareum. Has been exterminated in M.

Since the above list was written an examination of some hitherto unexplored lakes has added—

Ceratophyllum aquaticum. M.
Lycopus europæus. M.
Naias flexilis. M.

It may interest botanists visiting Perth to know that specimens (illustrating the distribution) of almost every Perthshire plant are preserved in the Perthshire Herbarium of the Perthshire Natural History Museum.

A SYNOPSIS OF THE GENUS *SELAGINELLA*.

By J. G. Baker, F.R.S., &c.

(Continued from p. 247.)

152. S. trichobasis, n. sp. — Stems suberect, ½–1 ft. long, angled on the face, flat on the back, the root-fibres confined to the base, densely decompound, the crowded ascending branches elongated and copiously pinnate, the branchlets subflabellate. Leaves of the lower plane crowded, except in the lower part of the main stem, ovate-lanceolate, acute, spreading, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green, moderately firm in texture, very unequal-sided, with a large cordate strongly ciliated auricle on the upper side at the base, which is much imbricated over the stem; leaves of the upper plane small, obovate, much imbricated, with a cusp as long as the blade. Spikes copious, $\frac{1}{4}$–$\frac{1}{2}$ in. long, 1 lin. diam.; bracts ovate-lanceolate, crowded, strongly keeled.

Hab. Penang, *Wallich*! (included in Herb. Ind. under No. 120); Singapore, *Sir W. Norris*! A near ally of *S. Plumea*.

153. S. cochleata Spring Mon. ii. 121; *Lycopodium cochleatum* Hook. & Grev.—Stems suberect, tetragonous, about a foot long, decompound, the branching midway between pinnate and flabellate. Leaves of the lower plane crowded, spreading, oblong-rhomboid, obtuse, ⅛ in. long, bright green, rigid in texture, unequal-sided, dilated, broadly rounded and serrulate on the upper side at the base; leaves of the upper plane half as long, ovate, with a long cusp, much imbricated. Spikes square, $\frac{1}{4}$–$\frac{1}{2}$ in. long, 1 lin. diam.; bracts ovate, with a long cusp, strongly keeled.

Hab. Adams Peak, Ceylon, *Moon*! I have seen only Hooker and Greville's single type-specimen, which is in the herbarium of the British Museum.

154. S. ATROVIRIDIS Spring Mon. ii. 124; *S. trinervia*, *intermedia*, and *Blumei* Spring Mon. ii. 125–128; *Lycopodium atroviride* Wall. Cat. No. 120; Hook. & Grev. Ic. Fil. t. 39; *L. furcatum* Roxb.; *L. intermedium* Blume. — Stems suberect, ½–1 ft. long, bisulcate down the face, flat on the back, the root-fibres confined to the lower part, decompound, the branching between dichotomous and pinnate. Leaves of the lower plane close both on the stem and branches, spreading or rather ascending, oblong-rhomboid, subobtuse, 1-5th to 1-4th in. long, spuriously 3-nerved, bright green, rather firm in texture, unequal-sided, broadly rounded, obscurely or distinctly ciliated and imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, oblong, with a long cusp, much imbricated. Spikes square, ½–1 in. long, 1 lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Madras, Malay peninsula and islands, South China, Hong-Kong and Formosa. Well known in cultivation.

155. S. ALOPECUROIDES Baker in Trimen's Journ. 1881, p. 368. —Stems ascending, above a foot long, with several ascending simple or 2–3-furcate branches. Leaves of the lower plane crowded, oblique lanceolate, 3½–4 lin. long, produced on the upper side at the base, with a large cordate auricle imbricated over the stem, moderately firm in texture, bright green, not ciliated; leaves of the lower plane ovate, ascending, much imbricated, ⅛ in. long, not cuspidate. Spikes square, ½–1 in. long, ⅙ in. diameter. 2–3-nate from the tip of the branches; bracts rigid, uniform, ovate acuminate, erecto-patent, strongly keeled.

Hab. Borneo, *Curtis* 83! The finest of the Old World Ascendentes, rivalling *articulata* in the breadth of its leafy stems.

156. S. CUMINGIANA Spring Mon. ii. 126.—Stems suberect, a foot or more long, flat on the back, bisulcate down the face, copiously pinnate, the ascending branches again copiously pinnately compound. Leaves of the lower plane crowded on the branches, spaced on the lower part of the main stem, spreading or rather ascending, oblong-rhomboid, obtuse, spuriously 3-nerved, bright green, moderately firm in texture, nearly equal-sided, rounded and shortly ciliated on both sides at the base, laterally attached and not imbricated on the upper side over the back of the stem; leaves of the upper plane oblique obovate, much imbricated, not at all cuspidate. Spikes square, 1–2 in. long, 1 lin. diam.; bracts ovate acuminate, strongly keeled.

Hab. Philippines, *Cuming* 2011! 2012! A plant from Borneo, *Motley* 829!, differs by having cusps to its leaves of the upper plane.

157. **S. Kalbreyeri**, n. sp. — Stems 1–1½ ft. long, ascending from a decumbent base, the root-fibres confined to the base, the face angled, the few ascending pinnæ elongated, lanceolate, 2–3-pinnate, sometimes whip-like at the tip, the final branching subflabellate, the ultimate divisions ¼–½ in. long, ⅛ in. broad. Leaves

of the lower plane contiguous on the final branches, spaced on the pinnæ and main stem, oblong-lanceolate, acute, ascending, falcate, 1-12th to 1-8th in. long, bright green, moderately firm in texture, dilated, broadly rounded, strongly ciliated and imbricated over the stem on the upper side at the base ; leaves of the upper plane very small, obovate, with a cusp as long as the lamina. Spikes not seen.

Hab. Cameroon mountains, 2500 ft., *Kalbreyer* 164 ! A near ally of *S. monospora*.

158. **S. oligoclada,** n. sp. — Stems ascending, a foot or more long, slender, stramineous, flat on both back and face, copiously pinnate, the erecto-patent branches sparingly pinnately compound. Leaves of the lower plane contiguous or nearly so on the branches, rather ascending, oblique ovate, acute 1-12th to 1-8th in. long, dark green, moderately firm in texture, dilated on the upper side, serrulate, broadly rounded and much imbricated over the stem on the upper side at the base ; leaves of the upper plane one-third as long, ovate, with a short cusp. Spikes short, square, ½ lin. diam. ; bracts ovate-cuspidate, strongly keeled.

Hab. Andes of Ocana, New Granada, alt. 8000–9000 feet, *Kalbreyer* 1080 !

159. **S. regularis,** n. sp. — Stems about ½ ft. long, suberect, with the root-fibres confined to the lower third, bisulcate down the face, regularly pinnate, the lower branches copiously compound. Leaves of the lower plane rather spaced, except at the tip of the branchlets, rather ascending, ovate- or oblong-lanceolate, acute, a line long, bright green, rather thin in texture, unequal-sided, serrulate, not distinctly ciliated, broadly rounded and a little imbricated over the stem on the upper side at the base ; leaves of the upper plane a third as long, oblique ovate, with a short cusp. Spikes ¼–½ in. long, square, ½–1 lin. diam. ; bracts ovate-cuspidate, crowded, strongly keeled.

Hab, In Eastern Peru, near Tarapoto, *Spruce* 3977 !

160. **S. assurgens,** n. sp.—Stems suberect, decompound, ½ ft. long, convex on the face, flat on the back, the close ascending branches copiously compound. Leaves of the lower plane contiguous on the branchlets, spaced on the branches and main stem, ascending, oblong-lanceolate, acute, 1-12th to 1-8th in. long, bright green, moderately firm in texture, rather unequal-sided, broadly rounded, denticulate and a little imbricated over the stem on the upper side at the base ; leaves of the upper plane half as long, ovate, with a long cusp. Spikes copious, square, ¼–½ in. long, 1 lin. diam. ; bracts ovate, acute, strongly keeled.

Hab. South Brazil, *Gardner* 76 ! *Burchell* 2238 ! *Glaziou* 5215 ! 5637 ! 7968 ! Midway between *erectifolia* and *Martensii*.

161. **S. subcaulescens,** n. sp. — Stem above ½ ft. long, stiffly erect, acutely angled on the face, simple near the base, closely pinnate, with erecto-patent copiously compound branches. Leaves of the lower plane contiguous and rather ascending on the branchlets, much spaced and spreading on the main stem, oblong- or ovate-lanceolate, acute, 1-12th to 1-8th in. long, bright green, moderately firm in texture, broadly rounded and shortly ciliated on the upper

side at the base, and a little imbricated over the stem; leaves of the upper plane small, ovate, with a long cusp. Spikes short, square, ½ lin. diam.; bracts ovate-cuspidate, strongly keeled.

Hab. Eastern Cuba, *C. Wright* 1822!

(To be continued.)

SHORT NOTES.

Tolypella prolifera Leonh. in Cambs. and Hunts.—This rare species grows in the parishes of Welche's Dam and Benwick, in Cambridgeshire, and just within the Huntingdonshire boundary, in Ramsey parish, occurring rather sparingly along eight miles of Vermnyden's Drain. *Tolypella glomerata* Leonh. grows in profusion in the same localities, and is widely spread over the fens around Chatteris; but almost always near the main watercourses, as if it had been brought down by drainage from the high lands, where it is not uncommon as a pond plant on the Huntingdonshire clays. *Tolypella intricata* Leonh. grew by thousands this season in one or two of the Wash ditches below Mepal, a welcome addition to the flora of North Cambridgeshire.—Alfred Fryer.

Irish Plants. — I beg to record the rediscovery of *Saxifraga Hirculus* in the parish of Rasharkin, townland of Glenbuck, near Loughnaroon, Co. Antrim. It was found by the late Mr. David Moore, of Glasnevin, in 1837, when on the Ordnance Survey, and has not been discovered since. It is growing very sparingly on swampy ground, in flower on July 31st. I also found *Allosorus crispus* and *Polypodium Phegopteris* on Slievenanee sparingly. Both the Hymenophyllnms grow in Glendun.—S. A. Brenan.

Bees and Erica cinerea. — Müller, in his recently translated work on the Fertilisation of Flowers, in recording (p. 377) the visits of various bees to *Erica Tetralix*, states that the honey-bee usually bites through the corolla about midway, assigning as the reason that its proboscis is scarcely long enough to reach the nectary in the legitimate manner. On July 28th, near Sandringham, I watched for some time the visits of bees to the rather smaller flowers of *E. cinerea*. *Apis mellifica* was present in great numbers, and was doing its work in beneficial fashion. I noticed, however, that it also took advantage of holes already pierced in the corollas of very many of the flowers. Both myself and a botanical friend who was with me watched narrowly to see if the honey-bees made these holes, but in no case did we observe them do so. We also saw numerous humble-bees busy with the same flowers, which they visited in both the above ways. Presently we saw a *Bombus* pierce a sound corolla, and afterwards several other insects of the same kind repeated the operation. The action was rather boring than biting, and was comparable to pushing an awl without twisting through a thin deal-board. In some cases a distinct sound was heard, as when paper is pricked with a pin. am

not sure which species of *Bombus* it was, and regret I did not bring home a specimen. This, however, is not a point of great importance, as all the *Bombi* have, I believe, longer tongues than the honey-bee. The advantage to both bees of the perforation seemed to be that they could sip their sweets in greater comfort in the nearly erect position they assumed during their illegitimate visits than when turned half-over and hanging sideways to insert their tongues into the mouth of the flower; and this comfort seems to be a sufficient motive for the exercise of intelligence in the humble-bee. I cannot find that these facts concerning the Scotch Heath have been hitherto recorded. Dr. Ogle does not mention them in his account of the fertilisation of various species of *Erica* in vol. ix. of the 'Popular Science Review.'—J. T. Powell.

Cambridgeshire Fumarias. — *Fumaria confusa* has occurred at Chatteris this year; and, so far as I am aware, it has not been recorded from any locality in the county. Mr. Bedding, of Wisbech, found a plant, some years ago, which is mentioned in Professor Babington's 'Flora of Cambridgeshire' under the heading of "*? Fumaria capreolata.*" Fresh specimens of this form have been sent me by Mr. A. Balding, and Mr. A. Bennett refers them to *F. Boræi* Jord. This gives us two forms, from well-worked Cambridgeshire, not included in 'Topographical Botany.—Alfred Fryer.

Salvia pratensis in Bucks.—In the autumn of last year I was told that *Salvia pratensis* grew in a meadow belonging to Mr. Arthur Deane, of Colstrop, near Hambledon, Bucks; but, having myself frequently gathered *S. Verbenaca* in the immediate vicinity, I concluded that the latter species must have been mistaken for it. Early in this year, happening to be in the neighbourhood, I visited the spot, but the plant was not then in a sufficiently advanced state to determine its identity. However, a specimen was promised and duly sent; it proved to be undoubtedly *S. pratensis*, and is, I believe, the first record of its occurrence in the county of Bucks.—John Benbow.

Middlesex Plants.—A few weeks since I discovered a small colony of *Ophrys apifera*, about a dozen plants in all, in a meadow south of Harefield, surrounded by *Lathyrus Nissolia* and *Polygonum Bistorta*. On the same day I gathered *Sisymbrium Sophia* in a lane near Uxbridge, and since then several more specimens in the same locality. *S. Sophia* and *O. apifera* are both included in the list of "extincts" in the 'Flora of Middlesex,' there being apparently "no modern authority" for the former, and the latter not having been met with since Collinson's last record about the year 1790. Last week I came upon *Myriophyllum alterniflorum* in ponds near Northwood, a species unrecorded for the county since Blackstone's time, about 1737. Amongst many species omitted for this district, *Ranunculus hirsutus* grows in great profusion on the moors about Uxbridge, towards Harefield; and *Stellaria glauca* is to be found in a bog on the same moors. *Orobanche minor* I have frequently met with: it is abundant now in clover-fields between Harefield and

Rickmansworth, on both sides of the county boundary; yet the solitary instance of its occurrence given in the Middlesex Flora is "on *Trifolium arvense* at Twickenham, Macreight, 175. The only record." *Sedum Telephium* was plentiful, and undoubtedly wild, in the copses around these fields. Within the last day or two I have gathered *Geranium columbinum*, *Scirpus fluitans*, *Campanula hybrida*, and several other species, all of which appear to be singularly scarce in the county. For *C. hybrida* the only station given is Harefield, being "now confined to the chalk"; but it grows in fields about Ruislip reservoir-fields, far removed from the chalk. *Athyrium Filix-fœmina* (presumed to be "extinct") grows sparingly in Old Park Wood.—JOHN BENBOW.

NOTICES OF BOOKS.

The Student's Flora of the British Isles. By Sir J. D. HOOKER, K.C.S.I., &c. Third Edition. London: Macmillan, 1884, pp. xxiii. 563.

THIS latest edition of what is perhaps the most generally useful of our British Floras is noteworthy for the careful revision which has been bestowed upon it. Not only have certain obvious slips which disfigured the two preceding editions been corrected, but alterations of greater or less importance appear in every page and almost in every description; while every care has been taken to keep abreast of our advanced knowledge of the British Flora, both in regard to the species it comprises and to its distribution. It is only by comparing the second with the present edition that the extent of these alterations can be realised. For example, taking at random the genus *Saxifraga*, the description of each species is in some way modified. *S. Geum*, formerly placed as a subspecies of *S. umbrosa*, has now an independent position, while, on the other hand, *S. cæspitosa*, formerly retained as a species, is now reduced to a form of *S. hypnoides*. *S. Andrewsii* is relegated to the remarkable *omnium gatherum* of "excluded species." Sometimes we miss an interesting note, such as as that (in ed. 2), which states that "cultivated Ben Lawers specimens [of *S. cernua*] which in 1869 had imperfect flowers and axillary buds, had in 1870 flowers altogether like *S. granulata*." At other times some inconsistency seems noticeable; thus in ed. 2, the author says of *S. cæspitosa*, "this is usually so well marked a plant that I incline to regard it as distinct," while in ed. 3 he writes, "I have repeatedly studied the forms of *S. hypnoides* and its allies, and *always* with the result that the passage from *hypnoides* proper to *cæspitosa* is undefinable." But, taken as a whole, this third edition is a very notable advance upon its predecessors—an advance which we doubt not is in some considerable degree owing to the help which the author acknowledges from Mr. Baker and Mr. Nicholson. Mr. Ball has contributed many notes; Mr. Arthur Bennett has revised the Potamogetons; while the eighth edition

of Babington's 'Manual,' the second of 'Topographical Botany,' and Nyman's 'Conspectus,'—called by a curious and repeated slip, "the second edition of Nyman's '*Sylloge*'"—have all been consulted, with manifestly good results. The salutary influence of the last-named work is indeed distinctly traceable in the care bestowed upon the nomenclature, the revision of which forms one of the most noteworthy features in this new edition.

There is no doubt that a list of British plants drawn up in strict accordance with the laws of priority would present a somewhat startling appearance. Such a list has more than once been contemplated; and the late Mr. Pryor, with the writer of this notice, had made some progress in the compilation of one. The present 'Student's Flora' will do much to familiarise working botanists with the changes that must take place; and Sir Joseph Hooker is to be thanked for the line he has taken in the matter. But although much has been done in the right direction, the correct name has not always been adopted; in some cases, indeed, it has been deliberately ignored. Thus, Sir Joseph adopts the name *Lotus uliginosus* Schkuhr (Handb. ii. 42, 1808) for the plant usually called *L. major*, which he, following Nyman, does not consider to be the plant so called by Scopoli (Fl. Carn. ed. 2, ii. 86, 1772). But the plant was first distinguished by our countryman Dr. Beeke, who in 'Botanists' Guide,' p. 528 (1805), pointed out the character of the calyx teeth and named it *L. pilosus*—which name has priority and must of course stand. There is a tendency, too, in the 'Student's Flora,' and even in the 'Conspectus,' to decide arbitrarily that certain names are inappropriate and so cannot stand. Thus the name *Ranunculus Sardous* Crantz, is said by Sir J. Hooker to be "too inappropriate,"—as if a little appropriateness might be allowed, but not too much of it!—and so the more recent name of Curtis is retained: he states correctly that *Cladium germanicum* Schrad. (Retz.) is "an older name" than *C. Mariscus* Br., and yet retains the latter. In like manner Nyman retains the name *Tilia parvifolia*, rejecting *T. ulmifolia* Scop. as "nomen incongruum," * and Sir Joseph rejects Hudson's name *Sium erectum* for Linnæus's *S. angustifolium*, saying that the former "is a rather earlier name, but less appropriate." It seems to us that this is simply adopting Salisbury's principle,† which has been universally condemned. The observance of the law of priority is the only possible way of obtaining finality; and all attempts at evading this law, whether on the ground of "appropriateness" or temporary convenience, must ultimately fail, as

* The three species of *Tilia* which find a place in British books must all take different names from those usually received. Babington gives them as *T. intermedia* DC., *T. grandifolia* Ehrh., and *T. parvifolia* Ehrh. For the first two Sir J. D. Hooker substitutes the older names *T. platyphyllos* Scop. and *T. vulgaris* Hayne; over the third, which he retains, *T. ulmifolia* Scop. has precedence, but this should perhaps be set aside in favour of *T. cordata*, Mill. Dict. ed. viii. (1768). This name was placed by DeCandolle as a synonym of *T. platyphyllos*, to which species Miller's own specimen of *T. cordata* belongs, although his description points to *T. parvifolia*.

† Prodromus, vi. vii.

compromises with truth deserve to do. It is to be regretted that, even in the 'Genera Plantarum,' the learned authors have sometimes deliberately ignored this principle, as when they place *Schollera* of Roth (1788) as a synonym of *Oxycoccus* of Persoon (1805);* or suppress *Trichosporum* D. Don (1822), in favour of *Æschynanthus* Jack. (1823).

The rearrangement of our British plants in accordance with the 'Genera Plantarum' has resulted in some changes of name which will somewhat puzzle our field botanists. The specific name would enable them to identify *Habenaria conopsea*, as the generic would *Maianthemum Convallaria;* but they might be pardoned for inability to recognise *Blysmus compressus* under its new—or rather old—name, *Scirpus Caricis* Retz.; or *Mœnchia erecta* as *Cerastium quaternellum* Fenzl. (misspelt *quarternellum*), or for thinking *Elisma*, should they casually encounter it in their reading, a misprint for *Alisma*. Other restorations are *Carex echinata* Murr. (1770) for *C. stellulata* Good (1794); *Cephalanthera pallens* Rich. for *C. grandiflora* Bab.; *Radiola linoides* Gmel. for *R. Millegrana* Sm.; *Stellaria palustris* Ehrh. for *S. glauca* With.; *Luzula vernalis* DC. for *L. pilosa; Geranium perenne* Huds. for *G. pyrenaicum* L.

A few instances may be given in which further correction is desirable. D. Don originally spelt his genus *Dabœcia*, not *Dabeocia*. Salisbury, in establishing *Phyllodoce* (Parad. Lond. t. 36), called the only species *P. taxifolia;* this must obviously stand in preference to *P. cærulea* Bab., of which Sir Joseph places it as a synonym. On the other hand, when separating the genus *Calluna* (Trans. Linn. Soc. vi. 317), Salisbury gave no specific name to the plant on which it was based, a fact duly noticed by DeCandolle (Fl. France, iii. 608 (1805), who, while accepting Salisbury's genus, supplies a specific name, and calls it *Calluna erica*—a name which must ultimately be accepted for it.† *Carex rostrata* Stokes, as Mr. Pryor pointed out (Journ. Bot. 1881, p. 73), must supersede *C. ampullacea* Good. (1794). *Arenaria hirta* Wormsk. (Fl. Danica, t. 1646 (1819)) rightly replaces *A. rubella* Hook.; but an earlier name than either is *A. sulcata* Schlecht. (Mag. Gesellschaft. Nat. Freunde, vii. 212 (1816)). The Helianthemums require a good deal of alteration. *H. vulgare* Gaertn. (De Fruct. i. 371 (1788)) and *H. canum* Dunal (D.C. Prod. i. 277 (1874)) must yield tó *H. Chamæcistus* and *H. marifolium*, both published by Miller (Gard. Dict. ed. viii.) in 1768; and Miller, too, must stand instead of Persoon, as the authority for *H. polifolium*, published by the latter in 1807. *Tragopogon minus* Miller (1768), must replace *T. minor* Fries (1828). In *Linaria*, again, Miller, not Aiton, should be credited with *L. repens; L. Elatine* is spelt *L. Elatina* by Miller; and there seems no reason why *L. viscida* Mœnch (1794) should not

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* *Schollera Oxycoccus* Roth. Tent. Fl. Germ. i. 170 (1788): *Oxycoccus palustris* Pers. Syn. i. 419 (1805). The genus, though retained in the 'Genera,' is sunk under *Vaccinium* in the 'Student's Flora.'

† We can find no evidence that Salisbury ever called the plant "*Calluna vulgaris* Salisb." That specific name seems to have been added by Hull (Brit. Flora i. 114) in 1808.

supersede *L. minor* Desf. (1798), of which DeCandolle quotes it as a synonym. *Agropyrum* was spelt by its founder, Gaertner, *Agropyron* (Nov. Comm. Petrop. xiv. pt. 1. 539). *Sieglingia* of Bernhardi (1799) must replace *Triodia* of Brown (1810). The present would have been a good opportunity for the restoration of *Blackstonia* of Hudson (1762), in place of Adanson's *Chlora* (1763). *Calamintha Acinos* Clairv. (in Gaud. Fl. Helvet. iv. 84 (1829)), must certainly be superseded by *C. arvensis* Lam., "nomen multo anterius" (1778) says Nyman,—who, however, adds, "sed sæpe incongruum," and promptly suppresses it. The specific names in *Selinum Carvifolia*, *Myrrhis Odorata*, and *Andromeda Polifolia*, are all entitled to capitals as old substantive names: Sir Joseph has *Selinum carvifolium* L., which is inaccurate. It is not easy to see how *Physospermum cornubiense* DC. (Prod. iv. 246 (1830)) can be retained, in the face of Sprengel's earlier *P. commutatum* (Umbell. p. 19 (1813)). The genus *Honkenya* being now generally placed under *Arenaria*, is not likely to trouble us much; but it may be remarked, in passing, that it is perhaps more widely and variously misspelt in British books than any name in existence; Bentham and Hooker writing it *Honckenya*, Babington *Honkeneja*, and Boswell (Syme) *Honkeneya*, the original spelling by Ehrhart being *Honkenya*, as above. It is not necessary further to multiply examples; those which have been adduced, and the very numerous ones in the 'Student's Flora,' will show how changed an appearance a list of British plants drawn up on sound principles would present from—say—the 'London Catalogue,' to which we are accustomed.

In one point of detail our British handbooks are uniformly inferior to the better working floras published on the Continent. In such books as Grenier and Godron's 'Flore de France,' or Koch's 'Synopsis,' the authority for the species is followed by a reference to the place of publication; this is a bibliographical help which takes up hardly any space and is often of great service to workers; perhaps Sir Joseph Hooker may see his way to adopting it in his next issue.

The appendix of "excluded species" presents an extraordinary mixture, including as it does the two groups styled respectively "aliens, casuals, waifs of cultivation," &c., and "ambiguities, errors, impositions, extinctions," in the 'London Catalogue.' We can quite understand Sir Joseph Hooker's feeling that these doubtful characters are not worth bothering about, and that any attempt at grouping them would be unsatisfactory. But the result is, as we have said, an extraordinary mixture. If, however, it may be regarded as to a great extent presenting a series of questions for solution, the list may be made both suggestive and interesting. Does *Pæonia corallina* still exist on the island of Steep Holmes in a naturalized state? If so, it might, we think, claim a place in the body of the book. *Laratera sylvestris* is called "an escape": but whence? Surely the plant is neither useful nor ornamental. Still more misleading is the placing of *Geranium striatum* as a "garden stray in shrubberies"; so critical an observer as our valued contributor Mr. T. R. Archer Briggs says it is "quite established

in a few spots"* near Plymouth, and other observers speak of its complete naturalisation in Cornwall. *Siler trilobum* and *Archangelica* might, we think, claim a place in the text as being at least naturalised, as indeed Sir Joseph admits the former to be, although he condemns it to this motley rout; *Centaurea Jacea* is also here, though admitted to be "probably indigenous"— a probability which Mr. Bloomfield's recent notes in our pages tend to confirm. *Linaria supina*, again, Mr. Briggs tells us,† has "grown at Cattedon [near Plymouth] for certainly more than forty years," and extends to "waste spots" there; but in the 'Student's Flora' it is styled "a casual on ballast," and so dismissed. *Euphorbia pilosa* enjoys the double honour of a place as a genuine "Britisher," on p. 357, and a further mention as an "excluded species."

It would of course be easy to multiply criticisms of this kind, but this would be neither gracious nor necessary. The omissions in the volume are very few, the most noticeable being the interesting *Naias alagnensis*, upon which we hope to lay shortly before our readers an exhaustive memoir from the pen of Mr. Charles Bailey. The 'Student's Flora' is now indispensable to the student of British plants; and we hope that the revisions of nomenclature introduced in its pages will promptly be adopted by working botanists.

JAMES BRITTEN.

Manual of the Mosses of North America. By L. LESQUEREUX and T. P. JAMES. pp. 447, tt. 6. Boston: Cassino & Co.

FOR the initiative of this important work we must look back to the year 1848, when Sullivant published in Gray's 'Manual of Botany,' brief descriptions of the Mosses of the northern United States,—only 205 in number, but exactly doubled in the second edition of the same in 1856. But the ample means and unceasing energy of Sullivant could not rest here, and he next gave to the world the two magnificent volumes of 'Icones,' with which his name will for ever be associated.

As new students and collectors entered the field—amongst the foremost of whom was Austin—new materials incessantly poured in, and it became necessary to supply a more complete guide to American Bryology. This Sullivant undertook, ably supported by the veteran Lesquereux, of Columbus, and T. P. James, of Cambridge, with the result before us, a beautifully printed volume with descriptions of some 900 species, which no doubt will be largely exceeded, as the more distant parts of the continent are more thoroughly scrutinized.

During its progress, Sullivant, James and Austin have been called away from their earthly labours, and to Lesquereux has been reserved the honour of completing the work.

The volume commences with the *Sphagnaceæ*, of which group 27 species are carefully described, two being new, *S. Garberi*, allied to *S. molle*, and *S. Fitzgeraldi*, close to *S. sedoides*; after which come *Andreæaceæ*, represented only by our three commoner British species.

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* Flora ymouth, 69. † Id. 238.

Then come the *Bryaceæ*, or mosses proper, arranged after the system of Schimper's 'Synopsis,' and hence the Cleistocarpi are still maintained for the heterogeneous little phascoid mosses, numbering 44 species. Among these one new genus, *Micromitrium*, has 3 species, while *Ephemerum* has 7, *Archidium* 5, and *Bruchia* no less than 14. *Dicranum* has 24 species, nearly all European, while of the 11 of *Campylopus* we have only two in Europe, and *Fissidens* has 24 species, of which 15 are non-European.

An interesting fact is the discovery in Wisconsin of the fruit of the long-known *Eustichia* (*Bryoxiphium*) *norvegica*, which has the calyptra surmounted by a long flexuose awn and a gymnostomous capsule. *Tortula* and *Desmatodon* include 61 species, of which 23 are endemic, while 4 of *Atrichum* 2 of *Oligotrichum*, and 6 of *Pogonatum* are non-European; *Fontinalis* and *Dichelyma* number 18 species, 11 being American only. The small group including *Cryphæa*, *Alsia*, *Leptodon* and *Thelia* is rich in native forms, and the tropical genus *Meteorium* is represented by 2 species. *Hypnum*, that terrible crux to the systematic bryologist, is, after the old fashion, maintained as an aggregate genus with 196 species, arranged in 28 subgenera, corresponding for the most part to Schimper's genera. When we consider the vast area of territory still unsettled, and the short duration of many of these plants, it is certain that new species will continue to reward the explorer for many years to come; but every worker in this field of Botany will be thankful for the volume before us, a credit to the authors, to the publishers, and to the country which has given it birth.

The eight beautiful plates given in Gray's 'Manual' of 1856 are also reprinted; and we may note that these were also issued in Schimper's 'Synopsis' of 1860, without any acknowledgement of their source.

R. Braithwaite.

The new (4th) edition of the 'Elementary Course of Botany, Structural, Physiological, and Systematic,' which, in spite of continued and extensive alterations, bears still Henfrey's name as author, has lately been issued. In its preparation Dr. Masters, the editor, has had the help of Mr. A. W. Bennett, who has "rewritten the whole of the sections relating to the Cryptogamia, and rendered great assistance in the chapters treating of Histology and Physiology." The typographical rearrangement is a decided improvement, and the omissions as well as the additions give evidence of a practised hand. Here and there the necessity for compression has caused some interesting subjects—as, for instance, carnivorous plants, and the fertilization of flowers by insects—to be treated with undue brevity; but the volume as a whole is a good summary of the present state of knowledge, and—no small boon to the student—it has an excellent index.

The New South Wales Government has lately purchased from Lord Brabourne an interesting collection of papers relative to Australia. It consists mainly of letters belonging to Sir Joseph Banks, including his correspondence with Captains Vancouver, Bligh, Flinders and King, and Colonel Paterson, covering the period between 1772 and 1815.

The last part (Vol. ix. pt. i.) of the 'Annales du Jardin Botanique de Buitenzorg' contains papers by M. Treub on the *Cycadeæ*, and on the embryo, embryo-sac and ovules; and W. Burck on the floral organisation in some *Rubiaceæ*, and on the Fern-flora of Borneo.

The last part (1883–4) of the Proceedings of the British Naturalist's Society contains a further instalment of Mr. J. W. White's 'Flora of the Bristol Coal-fields' (bringing the list down to *Amentiferæ*), and of Mr. Cedric Bucknall's 'Fungi of the Bristol District'; as well as a paper by Mr. White, on certain introduced plants of the neighbourhood, entitled 'Flora of the Avon Bed.'

Mr. Thomas Kirk sends us a fascicle of short papers lately contributed by him to the Transactions of the New Zealand Institute. The following new species are described:—*Podocarpus acutifolius* (with figure), *Aciphylla Traillii*, *Olearia Traillii*, *Brachycome Thomsonii* (fig.), *Raoulia Goyeni*, *Amphibromus fluitans* (fig.) *Carmichaelia Enysii* (fig.), *C. uniflora* (fig.).

An admirable model of what a popular monograph should be, comes to us from New York, in Mr. H. Baldwin's 'Orchids of New England.' Not too scientific to be popular, nor too popular to be scientific, it is just the book to put into the hands of an intelligent amateur who wishes to know something of the life-history of this interesting group of plants. Such standard authors as Darwin, Asa Gray and Meehan are largely quoted; but the volume is by no means a mere compilation, for the writer evidently knows intimately the plants he is writing about. There is a "comparative list," showing the range of each species through New England; a capital bibliography; a list of addresses of New England botanists; and an excellent index. The author is his own artist, and gives figures, which are a little too sketchy, of most of the species. Why should not our British orchids be treated in like manner?

Every working botanist will welcome a new edition (the tenth) of Prof. Morren's indispensable 'Correspondance Botanique.' It has been revised with great care, the help of botanists in various countries having contributed to render it very complete. No publisher's name or price is given; we believe it may be obtained from Prof. Morren, Liège, at very small cost.

The 'Report and Transactions of the Penzance Natural History and Antiquarian Society' for 1883–84 contains, among other interesting matter, papers by Mr. Ralfs and Mr. Curnow on 'The Marine Algæ of West Cornwall'; an interesting study of the flora of a very limited district entitled 'Carn, Marsh, Wood, and Hedgerow,' by Mr. Samuel Tait; a paper on the Sphagnums of West Cornwall,' by Mr. Curnow; and two chatty articles, 'The Mossists on the Tramp' and 'A Lichen Supper.'

Dr. Croumbie Brown sends us another of his useful works on forest science, entitled 'Forestry in Norway' (Edinburgh: Oliver & Boyd). Although avowedly a compilation, it is, like the rest of the series, an extremely useful and well-arranged handbook of the subject.

Mr. H. D. Geldart contributes to vol. iii. of the 'Transactions of the Norfolk and Norwich Naturalists' Society' a list of additions and corrections to the lists of Norfolk plants already published in the same Transactions.

The 'Boletim Annual' for 1883, issued by the Sociedade Broteriana of Coimbra, contains the following papers:—'Excursion botanique aux îles Berlengas et Farilhoes,' by J. Daveau (*Armeria berlengensis*, n. sp.); 'Contributiones ad floram mycologicam lusitanicam,' by Dr. G. Winter; 'Subsidios para o estudo da Flora Portugueza,' by I. de Mariz (Leguminosæ: *Ulex lusitanicus*, n. sp.); 'Apontamentos para o estudo da flora transmontana,' by A. X. P. Continho (*Armeria eriophylla* Willkomm, n. sp.); 'Plantas de Macau.' par J. Gomes da Silva.

We have received Nos. 1 and 2 of a new and handsome "quarterly, devoted to the historical and scientific discussion of the botany, pharmacy, chemistry, and therapeutics of the medicinal plants of North America, their constituents, products, and sophistications." It is entitled, 'Drugs and Medicines of North America,' Messrs. J. U. and C. G. Lloyd being the authors. The two numbers before us are devoted to the *Ranunculaceæ*; the accounts given of each species are very full, and the illustrations original and good. Messrs. Christy & Co., 155, Fenchurch Street, E.C., are the London agents, and the subscription price is 5*s*. per annum.

New Books. — G. Kassner, 'Ueber das Mark einiger Holzpflanzen' (Breslau, Kern, 1884: 8vo, pp. 38, tt. 2).—A. Allescher, 'Verzeichnis in Südbayern beobachteter Basidiomyceten' (München, Kellerer: 8vo, pp. 64). — S. Schiller, 'Materialien zu einer Flora des Presburger Comitates' (Presburg, Wigand: 8vo, pp. 50). — E. Strassburger, 'Das Botanische Practicum' (Jena, Fischer: 8vo, pp. xxxvi. 664). — G. Haberlandt, 'Physiologische Pflanzenanatomie' (Leipzig, Engelmann: 8vo, pp. xii. 399: 140 cents.).— A. De Bary, 'Vergleichende Morphologie & Biologie der Pilze, Mycetozoen & Bacterien' (Leipzig, Engelmann: 8vo, pp. xvi. 559: 198 cents.). — H. Baldwin, 'The Orchids of New England' (New York, Wiley: 8vo, pp. 158: 40 figures). — J. C. Brown, 'Forestry in Norway' (Edinburgh, Oliver & Boyd: 8vo, pp. viii. 227).— W. A. Kellerman, 'Plant Analysis: a classified list of the wild flowers of the Northern United States' (Philadelphia, Potter: 8vo, pp. viii. 253: 130 figs.). — E. A. & C. Apgar, 'Plant Analysis; adapted to Gray's Botanies' (New York, Ivison & Co.: 4to, pp. 12: remainder consists of blank forms for description).

Articles in Journals.

American Naturalist.—A. F. Foerste, 'Notes on Passion-flowers.' —*Hypnum Barberi* Renauld, sp. n. — C. M. Weed, 'Fertilisation of *Pedicularis canadensis*.'

Ann. and Mag. Nat. Hist. — R. Kidston, 'New species of *Lycopodites* (*L. Stockii*) from the Calciferous Sandstone Series of Scotland' (1 plate).

Bot. Centralblatt (No. 34). — F. Heyer, 'Zur Kenntniss der Farne das Carbon und des Rothliegenden im Saar-Rhein-Gebiete.'

Bot. Zeitung (July 18, 25, Aug. 1). — E. Fischer, 'Zur Entwickelungsgeschichte der Gastromyceten.' — (Aug. 1). Memoir of H. R. Goeppert (July 25, 1800—May 18, 1884). — (Aug. 8, 15, 22). L. Errera, 'Die grosse Wachsthumsperiode bei den Fruchtträgen von Phycomyces.'

Bull. Torrey Bot. Club (June). — G. Vasey, 'New Grasses' (*Panicum Chapmani*, *P. Hallii*, spp. nn.). — A. F. Foerste, Development of *Podophyllum*. — C. B. Plowright, '*Æcidium Bellidis*.' — (July 1). J. B. Ellis & J. M. Everhart, 'New N. American Fungi.' —B. D. Gilbert, 'Notes on Botrychia.'

Gardeners' Chronicle (Aug. 2). — *Aerides Sanderianum* Rchb. f., n. sp. — (Aug. 9). *Bulbophyllum Sillemianum* Rchb. f., n. sp. — *Halesia hispida* (fig. 34). — (Aug. 16). *Dyckia leptostachya* Baker, n. sp. — *Plagianthus Lampenii* (fig. 39). — *Pinus uncinata* (fig. 42). — (Aug. 23). *Kniphofia Leichtlinii* var. *distachya* Baker. — *Pseudolarix Kaempferi* (fig. 48). — W. G. Smith, 'Diseases of Mushrooms' (*Fusiporium mucophytum* W. Sm.).

Journ. Linn. Soc. xxi. 134 (Aug. 18). — J. Ball, 'Contributions to Flora of N. Patagonia' (*Margyricarpus Clarazii* Ball, *Chuquiraga Kingii* Ball, *Lantana Clarazii* Ball, *Sisyrinchium Clarazii* Baker, *Stipa Clarazii* Ball, spp. nn.). — J. Schaarschmidt, 'Notes on Afghanistan Algæ' (*Microcoleus Aitchisonii*, *Cosmarium Aitchisonii*, *C. Hookeri*, *C. Oliveri*, spp. nn.: 1 plate). — C. F. White, 'Pollen of *Papaver Rhœas* from Funereal Garlands found in an Egyptian Tomb' (1 plate). — C. B. Clarke, 'Flora of Parasnath.' — R. A. Rolfe, 'On *Hyalocalyx*, a new genus of *Turneraceæ* from Madagascar' (*H. setiferus*, sp. unica: 1 plate).

Journ. Royal Microscopical Society. — J. H. L. Flögel, 'On the Structure of the Cell-walls of Diatoms.'

Knowledge (Aug. 22).—Grant Allen, 'Sunflowers.'

Midland Naturalist. — A. W. Wills, 'Preservation of Native Plants.' — W. B. Grove, 'On the *Pilobolidæ*.' — J. E. Bagnall, 'Flora of Warwickshire' (*Amentiferæ—Araceæ*).

Naturalist.—J. Backhouse, 'Teesdale Botany.'

Nuovo Giornale Bot. Italiano (July 24). — U. Martelli, 'Gli Agaricini del Micheli.'—P. Pichi, 'Sulla *Beta vulgaris* var. *saccharifera*.'—A. Piccone, 'Contribuzione all' algologia eritrea' (3 plates).

Œsterr. Bot. Zeitschrift. — V. v. Janka, 'Botanisches aus Spanien.' — A. Hausgirg, 'Beiträge zur böhmischen Thermalalgenflora.'—D. Hirc, 'Floristisches aus Croatien.'—E. Formánek, 'Flora der Beskiden.' — P. G. Strobl, 'Flora des Etna.'

Pharmaceutical Journal (Aug. 16). — W. Elborne, 'Report on English Rhubarb.' — (Aug. 23). W. Ferguson, 'The Noyau Vine, *Ipomœa sinuata*.'

Science Monthly.—'Rushes' (illustrated).

ON SOME PLANTS OF NORFOLK ISLAND, WITH DESCRIPTION OF A NEW *ASPLENIUM*.

By Baron Von Mueller, K.C.M.G., M.D., Ph.D., F.R.S.

The small far-isolated terrestrial rise, called Norfolk Island, in the Pacific Ocean, although considerably nearer to New Zealand than to Australia, pertains, as regards its original vegetation, much more to the latter than to the former; and moreover, as it is a political dependency of New South Wales, it will be best to count its plants with those of Australia, especially as Lord Howe's Island, situated almost half-way, is, in reference to its vegetation, treated always as Australian. The indigenous plants of Norfolk Island engaged long ago the careful scrutiny of Professor Endlicher, his 'Prodromus Floræ Norfolkianæ,' issued in 1833, resting on dried specimens and a magnificent set of drawings prepared by Ferdinand Bauer during his stay on the island in part of the years 1804 and 1805. Equally well it is known that Allan Cunningham, nearly forty years after, visited this lonely spot, and supplemented the Endlicherian records by a short treatise in Sir William Hooker's 'London Journal of Botany,' i., 121–123. Since then but very sparingly have any notes appeared on the plants of the island, so that some of the species remain still involved in obscurity. Being eager to elucidate these for the Flora of Australia, I was fortunate enough, through the kind interest of the resident magistrate, to animate Mr. Isaac Robinson, a resident on the island, to form gradually a complete collection of such of the plants as still exist there, whereby to some extent for Science may be preserved the primeval types of the endemic portion of the vegetation, many of which seemingly doomed to annihilation, if indeed not already some of them, by their local destruction, become swept away already from the surface of the globe. As might be expected, this first sending of plant-specimens does not comprise any absolutely new specific forms, except one fern; and this may have been obtained at some very secluded place, perhaps on some abrupt cliffs not accessible to Bauer and Cunningham. The following are the characteristics of this fern, which I gladly dedicate to its finder:—

Asplenium Robinsonii.—Rhizome densely beset with linear-lanceolate long- and thin-acuminated scales; stipe almost as long as the frond, nearly black, shining, triangular, destitute of scales; frond glabrous, crisped, thickly chartaceous when dry, elongated-oblong in outline, blunt at the apex, suddenly truncated at the base, slightly incised towards the summit, thence downward gradually but not regularly cleft deeper, the incisions reaching the rachis towards the base of the frond, the lobes blunt and wavy crenated; the lower broadly adnate and somewhat oblong-cuneate; veins crowded parallel, divided into 2–4 branches, reaching the margin of the frond; sori variable in length, narrow, developed on

the upper half of the frond only, almost horizontal, neither reaching its margin nor the midrib.

Fronds probably solitary from the rhizome, that of the only specimen hitherto received somewhat above 1 ft. long, towards and below the middle 3-4 in. broad; sori varying in length from $\frac{1}{8}$–$\frac{3}{4}$ in.; indusia mostly turned upwards, exceptionally downward, solitary or very rarely 2-convergent, and then overlapping.

This new fern differs from *A. Scolopendrium* in the longer as well as thicker smooth and not pale brown stalk, in the probably always divided and often longer frond not descendingly bilobed at the base, in narrower sori nowhere reaching the edge of the frond, and in the not normally paired sori. From *A. Scolopendropsis* (F. v. M., 'Papuan Plants,' 49–50) it is not difficult to distinguish *A. Robinsonii* by the thicker, neither pointed nor downward, gradually narrowed nor lobeless frond; by the solitary mostly shorter sori, which do not reach the margin and midrib. From *A. Fejense* our new species is easily separated on account of the much stouter, longer and scaleless stalk, the lobed broader and blunt frond thicker in texture, with very dark midrib, and with more branched and more spreading veins. The rhizome of *A. Robinsonii* (broken off in the only specimen) may be different from that of the three allied species just mentioned. To what variations this new fern may be subject future observations on extended material must demonstrate.

Mr. Robinson's collection contains also the following ferns as new for Norfolk Island:—*Pteris marginata* Bory, *Aspidium uliginosum* Kunze, *A. cordifolium* Sw., *A. molle*, *Hypolepis tenuifolia* Bernh., *Cheilanthes tenuifolia* Sw., and *Ophioglossum vulgatum* L.

Among the phanerogamous plants received in this first sending is also Endlicher's *Pterocarpus australis*, which certainly does not belong to that genus, but appears referable either to *Wistaria* or *Millettia*, or possibly *Lonchocarpus*. The specimen transmitted by Mr. Robinson is also devoid of fruit; but this so assiduously and circumspectly commencing observer of the Norfolk Island vegetation will likely, while completing the searches after plants at his insular home, put us in possession also of the fruit of this conspicuous climber, so that after fully eighty years since its discovery it may obtain a settled place in the phytographic system.

A NEW SPECIES OF *ARDISIA*.

By H. F. Hance, Ph.D.

Ardisia mamillata.—Radicibus fibrosis, caule 3–6 pollicari subherbaceo villoso, foliis mollibus oblongis margine remote et obscure crenatis utrinque obtusis supra lætevirentibus mamillis confertissimis singulo pilo articulato coronato obtectis subtus pallidis rugulosis pilis articulatis vestitis luci obversis punctis nigricantibus notatis 3–4½ poll. longis 18–21 lin. latis petiolo 4-lineali, umbellis solitariis ramulo pedunculove axillari circ.

2 poll. longo sub apice folia 1–4 plus minus deminuta gerente fultis circ. 12–15 floris, floribus nutantibus, pedicellis 4–5 lin. longis cum bracteolis linearibus 2 lin. longis calycisque segmentis linearibus albis acuminatis $2\frac{1}{2}$ lin. longis pilis articulatis obsitis, corollæ 5-partitæ glaberrimæ 5 lin. diametro laciniis ovatis acuminatis sub anthesi reflexis, teneris niveis minute rufo-punctatis, staminum corollæ subduplo breviorum filamentis brevissimis antheris acutis pallide stramineis, stylo subulato stamina paulo superante, bacca sphærica coccinea glaberrima piso minore.

In jugo Lo-fau-shan, prov. Cantonensis, juxta cœnobium Wong-lung-kún, alt. 600 ped. m. Aug. 1883, leg. C. Ford. (Herb. propr. n. 22239).

This charming compact little plant is worth cultivating for the rich bright foliage and wax-like blossoms, and, as Mr. Ford has it growing in a strong and healthy condition, I have no doubt it will soon find its way into English collections. Its nearest affinity is with the Hongkong *A. primulifolia*, Gardn. & Champ.

NOTES ON DORSET PLANTS.

By the Rev. W. Moyle Rogers, F.L.S.

(Concluded from p. 270).

Callitriche obtusangula Le Gal. C. Ditches at back of Lodmoor, in good quantity, July 5th, 1884. Not recorded for the county in Top. Bot. or Fl. Dors., but found, I believe, by Mr. Mansel-Pleydell, near Wareham, before the present year.

Bryonia dioica L. B. and C. Locally common.

Ribes rubrum L. C. Evershot. By the Frome, near Dorchester. Denizen or native?

Cotyledon Umbilicus L. C. Near Wareham railway station. Apparently local in District C., though common in B.

Chrysosplenium oppositifolium L. C. Ailwell.

Petroselinum segetum Koch. B. Ryme, Melbury Road.

Ægopodium Podagraria L. B. Chetnole. C. Evershot. Near Moreton Heath. Denizen In all.

Sium angustifolium L. C. By the Frome near Frampton.

Silaus pratensis Bess. B. Ryme, Chetnole and Leigh, common. C. Rampisham. Lodmoor. E. Bailey Ridge.

Torilis nodosa Gaert. B. Ryme. Chetnole.

Chærophyllum Anthriscus Lam. C. Open ground at end of lane south-east of Wareham railway station, on turfy banks near a farmhouse. Denizen.

Viburnum Opulus L. C. Near Evershot and Dorchester, but in no great quantity. Throughout the county *V. Lantana* seems far the commoner species.

Galium Cruciata With. C. Evershot. Maiden Newton. Local. —*G. Mollugo* L. Only locally common in Districts B. and C. — *G. palustre* L., var. *elongatum*. C. Near Dorchester, by the Frome.

Lodmoor. — *G. uliginosum* L. C. Evershot and Rampisham; meadows.

Asperula cynanchica L. C. Poundbury. Maiden Castle.

Valeriana dioica L. C. Evershot; marshy meadows near village and railway station, in great quantity.

Valerianella olitoria Mœnch. B. Ryme.

Carduus tenuiflorus Curt. C. Near Wareham railway station.— *C. crispus* L. B. Quite common. C. Black Down. Dorchester. Yellowham Wood. Local. — *C. pratensis* Huds. C. Meadows at Evershot. Moreton Heath. E. Bailey Ridge. — *C. acaulis* L. C. Downs about Dorchester, common.

Arctium majus Schk. B. In one place between Ryme and Melbury, on the Yeovil and Dorchester Road.--*A. minus* Schk. C. Evershot. Yellowham Wood.

Serratula tinctoria L. B. Ryme. Chetnole. C. Lodmoor.

Chrysanthemum segetum L. C. Puddletown Heath border. West Lulworth. The only places in the county where I remember to have seen it.

Tanacetum vulgare L. B. Ryme; denizen. The only Dorset locality known to me.

Achillea Ptarmica L. E. Bailey Ridge. This is frequent in District B.; but I have not seen it in C.

Filago minima Fries. C. Moreton Heath. Near Wareham railway station.

Senecio sylvaticus L. B. Ryme. C. Moreton Heath. Near Wareham railway station. — *S. erucifolius* L. B. Ryme. Yetminster. Leigh.

Cichorium Intybus L. C. Near Dorchester.

Picris hieracioides L. B. Ryme. C. Dorchester.

Tragopogon pratensis L. B. Ryme. C. Evershot.

Hieracium vulgatum Fries. G. Heathy ground by claypits near Creech.—*H. umbellatum* L. C. Black Down.

Campanula latifolia L. C. Near Evershot, about half-a-mile on the Rampisham Road, in a bushy ditch; several plants within a few feet of each other, 1883 and 1884. Not known as a native of Dorset, but apparently well established here. — *C. hybrida* L. Maiden Castle, border of cornfield.

Vaccinium Myrtillus L. B. Bubb Down.

Vinca minor L. Bound Lane, between Chetnole and Leigh. Perhaps native.

Gentiana Amarella L. C. Hilly pasture sloping to the west, about a mile from Evershot; abundant.

Cuscuta Epithymum Murr. C. Black Down. Moreton Heath. Puddletown Heath.

Mimulus luteus L. C. Riverside near mill, east of Dorchester, June, 1884. Alien.

Veronica Buxbaumii Ten. B. Ryme. C. Near Evershot and Dorchester. -- *V. montana* L. B. Melbury Park, C. Ailwell. Evershot; bushy place on Beaminster Road. -- *V. scutellata* L. C. Ditches below Moreton railway station, abundant.—*V. Anagallis* L. B. Yetminster. C. Ailwell. By the Frome at Frampton

and Dorchester, in great quantity. Far more frequent in Dorset than in Devon.

Orobanche minor L. B. Lillington. C. Near Evershot railway station. By Puddletown Heath.

Scutellaria minor L. C. Puddletown Heath.

Galeopsis Ladanum L. C. Evershot, in one place.

Lithospermum arvense L. B. Ryme. C. By Maiden Castle.

Myosotis cæspitosa Schultz. B. Leigh. C. Evershot. Rampisham. Maiden Newton. Moreton Heath. Near Wareham railway station. Weymouth. *M. repens* Don (so common in Devon) I have so far altogether failed to find in Dorset; *M. palustris* With. and *M. versicolor* Reich. are common in District C., but I have not seen either of them in B.—*M. arvensis* Hoffm., var. *umbrosa* Bab. C. Ailwell.—*M. collina* Reich. B. Ryme. G. Corfe Castle.

Cynoglossum officinale L. C. Weymouth.

Lysimachia vulgaris L. C. Near Wareham railway station.—*L. nummularia* L. C. Rampisham and Maiden Newton; wet meadows. E. Bailey Ridge.—*L. nemorum* L. C. Ailwell. Evershot.

Centunculus minimus L. C. Puddletown Heath.

Samolus Valerandi L. C. Lulworth Cove.

Plantago lanceolata L., var. *Timbali*. C. Frampton. By Maiden Castle.

Rumex pulcher L. C. Near Wareham railway station.

Polygonum Bistorta L. B. Melbury Park, in great quantity. Denizen? C. Near Evershot, in several places. Truly naturalized, if not native.

Daphne Laureola L. B. Between Ryme and Berwick. Leigh. I think probably native in this district.

Mercurialis annua L. C. Near Wareham railway station. West Lulworth.

Humulus Lupulus L. B. Ryme (seen only near houses). Chetnole, frequent. C. Evershot and Rampisham neighbourhoods. In some places perhaps native.

Populus tremula L. B. Leigh Drove. C. By the Frome near Dorchester. E. Bailey Ridge.

Potamogeton crispus L. C. In the river at Maiden Newton.

Triglochin palustre L. C. Meadows, Evershot.

Orchis pyramidalis L. B. Banks near Ryme, on the Dorchester Road. C. West Lulworth, *Miss L. Kingdon*, July, 1884.

Gymnadenia conopsea Brown. C. Maiden Castle. G. Bog near Creech.

Habenaria chlorantha Bab. B. Near Ryme. Melbury Park. E. Bailey Bridge.

Epipactis palustris Crantz. C. Boggy ground by Rampisham Wood, in great quantity, *Miss Jessie Rooke*, July, 1884.

Tulipa sylvestris L. B. Leigh Drove, a plant or two for several years; denizen. Discovered in 1879 by Miss Isabella Thompson, who sent me one of several flowers that she then gathered. A year or two later I saw the plants *in situ*. This year we could see no trace of them, but it was as late as July.

Luzula pilosa Willd. C. Ailwell. Yellowham Wood.—*L. multiflora* Koch. Common in Districts B. & C.

Carex paniculata L. C. Evershot.—*C. vulpina* L. Remarkably commen in Districts B. & C.—*C. muricata* L. B. Ryme. Yetminster. Leigh. C. Ailwell. Puddletown Heath. Upway. Chickerel. Near Wareham railway station. D. Lane between Yellowham Wood and Puddletown. E. Bailey Ridge. Hardly common, though widely distributed.—*C. dirulsa* Good. B. Ryme. Chetnole. C. Evershot. Puddletown Heath. Near Wareham railway station. D. Lane between Yellowham Wood and Puddletown.—*C. ovalis* Good. C. Common about Evershot.—*C. pilulifera* L. C. Black Down. E. Bailey Ridge.—*C. pallescens* L. C. Between Evershot and Rampisham, in damp hollow east of the Beaminster Road. The only place in Dorset where I have seen it. —*C. paludosa* Good. C. Evershot. Frampton.—*C. riparia* Curt. C. Maiden Newton. Lodmoor.

Avena pubescens L. B. Ryme. C. Frequent about Evershot and Dorchester. Near Maiden Newton. Yellowham Wood.

Triodia decumbens Beauv. B. Melbury Park. C. Evershot. Moreton Heath. Near Wareham railway station. E. Bailey Ridge.

Kœleria cristata Pers. (? b. *gracilis*). C. Poundbury. Maiden Castle.

Molinia cærulea Mœnch. C. Moreton Heath, Yellowham Wood, &c. E. Bailey Ridge.

Glyceria fluitans Brown, b. *pedicellata*. B. Chetnole. C. Upway. —*G. plicata* Fries. B. Ryme. C. Evershot. Rampisham. Near Weymouth, frequent.

Festuca pseudo-myurus Soyer. B. Chetnole. C. Moreton Heath. — *F. sciuroides* Roth. B. Ryme. C. Moreton Heath. Near Wareham railway station. Puddletown Heath.—*F. pratensis* Huds., b. *loliacea*. B. Ryme. Chetnole. C. Evershot. Dorchester. Upway. E. Bailey Ridge.

Bromus giganteus L. B. Ryme. Chetnole. Leigh. C. Evershot. —*B. racemosus* "Linn." (segregate). B. Ryme. Chetnole C. Evershot. Moreton Heath. Upway.

Triticum caninum Huds. B. Chetnole; by the river, in one place, in good quantity. The only Dorset locality known to me.

Hordeum pratense Huds. B. Stockwood. C. Upway. Lodmoor. —*H. murinum* L. C. Near Dorchester, in the London Road. Upway.

Nardus stricta L. E. Bailey Ridge.

Asplenium aculeatum Sw. B. Ryme, in two places. C. Evershot. Yellowham Wood. Nowhere abundant.—b. *lobatum*. C. Between Rampisham and Evershot, in one place, two or three plants.

Nephrodium Filix-mas Rich., b. *affine* and c. *Borreri*. C. Near Evershot, both fairly frequent.

Equisetum maximum Lam. C. Evershot. Rampisham. Lodmoor. Locally common.

A SYNOPSIS OF THE GENUS *SELAGINELLA*.

By J. G. Baker, F.R.S., &c.

(Continued from p. 278.)

162. **S. contigua,** n. sp. — Stems ½ ft. long, suberect, with copious long root-fibres from the lower third, decompound, the branching between flabellate and pinnate, the face raised, the back flat. Leaves of the lower plane erecto-patent, crowded both on the stem and branches, lanceolate, pointed at the upper corner, 1-6th to 1-5th in. long, bright green, moderately firm in texture, unequal-sided, cordate and conspicuously ciliated on the upper side at the base, and so much imbricated over the stem that it is quite hidden; leaves of the upper plane ovate, with a long squarrose cusp, much imbricated. Spikes square, ¼–½ in. long, 1 lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Rio Janeiro, *Glaziou* 4493! 5638! A near ally of *Martensii* and *atroviridis*.

163. **S. rigidula,** n. sp. — Stems stout, stramineous, suberect, above a foot long, with the root-fibres confined to the base, copiously pinnate, the ascending branches copiously pinnately compound, with short regular simple or forked branchlets. Leaves of the lower plane contiguous or nearly so on the branchlets, ascending, oblique ovate, acute, ⅛–⅙ in. long, bright green, rather firm in texture, unequal-sided, strongly serrulate on the upper margin, broadly rounded and much imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, ovate, with a large cusp. Spikes copious, short, square, ¾–1 lin. diam.; bracts ovate-cuspidate, strongly keeled.

Hab. Andes of Ocana, New Granada, alt. 5000–6000 feet, *Kalbreyer* 972! A near ally of *S. Martensii*.

164. S. BAHIENSIS Spring Mon. ii. 153. — Stems quadrangular, suberect, a foot long, with long copiously pinnate flexuose branches, with compound branchlets. Leaves of the lower plane ovate-oblong, subacute, subfalcate, ⅙ in. long, twice as long as broad, horizontal from an oblique base, bright green, rather rigid in texture, the margin much reflexed, the upper edge serrulate and rounded at the base; leaves of the lower plane ovate, with a long cusp. Spikes short, square; bracts ovate-lanceolate, strongly keeled.

Hab. Bahia, *Blanchet*.

165. S. CALIFORNICA Spring Mon. ii. 98.—Stems slender, tufted, suberect, 4–6 in. long, tetragonous, copiously pinnate, with erecto-patent sparingly compound branches. Leaves of the lower plane ascending, crowded on the branchlets, ovate, obtuse, ⅛ in. long, minutely cuspidate, light green, rather rigid, twice as long as broad, unequal-sided, subcordate and denticulate on the upper side at the base, and imbricated over the stem; leaves of the upper plane very small, ovate-oblong, cuspidate. Spikes short, simple, square; bracts ovate-lanceolate, sharply keeled.

Hab. California, *Deppe*. I have not seen this.

166. S. Martensii Spring Mon. ii. 129; *S. Poppigiana* Hook. Fil. Exot. t. 56, non Spring; *Lycopodium flabellatum* Mart. & Gal., non Linn.—Stems ½–1 ft. long, trailing in the lower half, with copious long root-fibres, ascending in the upper half, decompound, the branching between pinnate and flabellate, flat or terete on the back, strongly angled in the lower part on the face. Leaves of the lower plane usually crowded, erecto-patent, oblong-lanceolate, subobtuse, bright green, moderately firm in texture, unequal-sided, broadly rounded, serrulate, not distinctly ciliated, and a little imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, oblique-oblong, with a long cusp, much imbricated. Spikes ¼–½ in. long, square, 1 lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Common in Mexico. This is now the commonest species in European gardens, next to *S. Kraussiana*. In Ann. Sc. Nat., series 4, vol. 13, p. 67, A. Braun fully defines its varieties. The most striking is *divaricata*, with fewer and more divaricating branchlets than in the type, and smaller and less crowded leaves.

167. **S. xiphophylla**, n. sp. — *S. flaccida* Spruce MSS., non Spring.—Stems suberect, ½ ft. long, forked low down, with copious long radicles from near the base, terete on the back, decompound, with branching between pinnate and flabellate. Leaves of the lower plane close on both branches and branchlets, erecto-patent, lanceolate, acute, ⅛–⅙ in. long, nearly equal-sided, bright green, not so firm in texture as in *Martensii*, rounded and shortly ciliated, and a little imbricated over the stem on the upper side at the base; leaves of the upper plane half as long, ovate, with a cusp as long as the lamina. Spikes copious, square, 1 lin. diam.; bracts ovate-lanceolate, crowded, strongly keeled.

Hab. Mount Guayrapurima, Eastern Peru, *Spruce* 3990! Differs from *sulcata* by its suberect habit and continuous stems.

168. S. bombycina Spring Mon. ii. 191. — Stem a foot or more long, suberect, bisulcate down the face, copiously pinnate, the branches erecto-patent, the lower elongated and again regularly closely pinnate. Leaves of the lower plane contiguous, rather ascending, lanceolate, rather falcate, pointed at the upper corner. ¼–⅓ in. long, dark green, moderately firm in texture, unequal sided, very cordate, strongly ciliated and much imbricated over the stem on the upper side at the base; leaves of the upper plane one-third to one-fourth as long, oblique ovate, cuspidate, much imbricated. Spikes terminal on the branchlets, ½–1 in. long, square, 1 lin. diam.; bracts ovate-lanceolate, very crowded, strongly keeled.

Hab. Andes of Eastern Peru, *Matthews* 1781! *Spruce* 4628! A very fine and well-marked species.

169. S. chrysoleuca Spring, Mon. ii. 197; *S. Sprucei* Hook. 2 Cent. Ferns, t. 83.—Stems a foot long, trailing or simple in the lower half, with long root-fibres, deltoid and ascending in the upper half with simple or forked ascending branches. Leaves of the lower plane crowded and spreading horizontally both on the stem and branches, lanceolate, subobtuse, ⅙–¼ in. long, bright green, moderately firm in texture, rather unequal-sided, serrulate, broadly

rounded on the upper side at the base, and much imbricated over the stem; leaves of the upper plane half as long, ovate, with a long cusp, much imbricated. Spikes copious, lateral, square, ¼–1 in. long, 1-12th to 1-8th in. diam.; bracts ovate-lanceolate, crowded, strongly keeled.

Hab. Andes of Peru, *D'Orbigny*! *Spruce* 4623! *Pearce*! New Granada, *Kalbreyer* 962! A very fine and distinct species.

170. S. RUBELLA Moore in Gard. Chron. 1871, 902, fig. 190.— Stems a foot long, suberect, with root-fibres from the lower half, reddish brown, bisulcate on the face, pinnately branched, the lower branches cuneate, with 5–7 branchlets. Leaves of the lower plane spreading or rather ascending, crowded on the branchlets, oblique-oblong, obtuse or obscurely cuspidate, 1-12th to 1-8th in. long, moderately firm in texture, dark green, turning reddish with age, more produced on the upper side at the base, where it is ciliated and imbricated over the stem; leaves of the upper plane half as long, ovate-cuspidate, much imbricated. Spikes square, ½–1 in. long, 1 lin. diam.; bracts deltoid, with a long cusp, strongly keeled.

Hab. Native country unknown. Introduced into cultivation by Mr. B. L. Williams about 1870. Intermediate in general habit between *Martensii* and *concinna*.

GROUP III.—ARTICULATÆ.

171. S. EPIRHIZOS Spring Mon. ii. 218. — Stems 1–2 ft. long, decumbent in the lower part, with long root-fibres from the nodes, forked low down, sulcate down the face, ascending in the upper part, copiously pinnate, with short erecto-patent simple or little-compound branches. Leaves of the lower plane crowded on the branches, spaced on the stem, rather ascending, oblong-lanceolate, acute, rather falcate, bright green, moderately firm in texture, 1-6th to 1-5th in. long, unequal-sided, not ciliated, broadly rounded, and a little imbricated over the stem on the upper side at the base; leaves of the upper plane one-third as long, oblique ovate, much imbricated, not cuspidate. Spikes square, ¼–½ in. long, 1 lin. diam.; bracts ovate, acute, strongly keeled.

Hab. French Guiana, *Leprieur*! Dutch Guiana, *Hostmann*, *Kappler*. British Guiana, *Jenman* 645!

172. S. GALEOTTEI Spring Mon. ii. 220. — *S. vexata* Liebm.— *Lycopodium stolonifernm* and *fruticulosum* Mart. & Gal.— Stems 1–2 ft. long, suberect, with root-fibres from the lower half, sometimes excurrent and whip-like at the tip, flat on the back, bisulcate on the face, copiously pinnate, the branches pyramidal and decompound. Leaves of the lower plane close on the branchlets, spaced on the branches and stem, ascending, lanceolate or oblong-lanceolate, acute, ⅛–⅙ in. long, bright green and moderately firm in texture, more produced on the upper side of the midrib, laterally attached, not imbricated over the stem, broadly rounded and shortly ciliated on the upper side at the base, truncate and auricled on the lower; leaves of the upper plane one-third to one-half as long, oblique ovate or oblong, acute, much imbricated. Spikes ¼–½ in. long, 1 lin. diam., square; bracts ovate cuspidate, strongly keeled.

Hab. Common in Mexico, *Galeotti* 6606! *Linden* 85! *Bourgeau* 1425! *Hahn* 2025! Guatemala, *Salvin & Godman* 373! Frequent in gardens. I do not think Spring's Panaman and Bolivian plants are this species, but his *S. Poeppigiana* var. *mexicana* belongs here.

173. S. SERICEA A. Br. in Crypt. Nov. Gran. 382. — Stems stout, suberect, a foot or more long, flat on the back, deeply bisulcate down the face, sending out long radicles from the lower nodes, copiously pinnate, the erecto-patent branches flabellately compound. Leaves of the lower plane crowded and rather ascending on the branches, spaced on the main stem, oblong-lanceolate, obtuse, $\frac{1}{4}$–$\frac{1}{3}$ in. long, bright green, firm in texture, unequal-sided, not ciliated, auricled on both sides at the base, dilated and broadly rounded on the upper side, and much imbricated over the stem; leaves of the upper plane one-third as long, oblique ovate, acute. Spikes square, $\frac{1}{2}$–1 in. long, 1 lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Andes of Quito, *Jameson*! *Spruce* 4716! *Sodiro*!

174. S. ARTICULATA Spring Mon. ii. 211. — *Lycopodium articulatum* Kunze.—Stem 1–2 ft. long, suberect, with very long radicles from the lower nodes, flat on the back, deeply bisulcate down the face, copiously pinnate, the ascending branches copiously flabellately compound. Leaves of the lower plane crowded and more or less ascending on the branches, spaced and spreading on the main stem, oblong-rhomboid, obtuse, $\frac{1}{4}$–$\frac{1}{3}$ in. long, bright green, moderately firm in texture, nearly equal-sided, not ciliated, rounded and distinctly auricled on the upper side at the base, and a little imbricated over the stem; leaves of the upper plane one-third as long, oblique ovate, acute, much imbricated. Spikes square, $\frac{1}{4}$–$\frac{1}{2}$ in. long, 1 lin. diam.; bracts ovate, acute, crowded, strongly keeled.

Hab. Andes of Eastern Peru, *Poppig*! *Matthews* 1085! *Spruce* 4628! Ecuador, in the woods of Archedona, *Jameson* 714!

GROUP IV.—RADIATÆ.

175. S. PHILIPPINA Spring. Mon. ii. 105.—*S. Cumingiana* Presl., non Spring. — *Lycopodium microstachyum* Desv. ? — Stems slender, erect, half a foot long, quadrangular, flat on the face, copiously pinnate, the lower branches long and copiously compound. Leaves of the lower plane spaced even on the branchlets, erecto-patent, oblong, acute, bright green, membranous, $\frac{1}{2}$ line long, nearly equal-sided, all the upper margin shortly ciliated, its base rounded, and a little imbricated over the stem; leaves of the upper plane one-half as long, ovate, acute. Spikes short, square, $\frac{1}{2}$ lin. diam.; bracts ovate, acute, strongly keeled. Var. *khasiensis* Baker.—Leaves of the lower plane more numerous, closer and more spreading, narrower, and more acute.

Hab. The type in the Philippine Islands, *Cuming* 1999!; the variety gathered by Griffith in the Khasia mountains.

176. S. FLACCIDA Spring Enum. No. 77.—*S. semicordata* Spring Mon. ii. 107 ex parte. — *S. radicans* Spring Mon. ii. 261. — *Lycopodium flaccidum* Bory. — *L. curvatum* Dalzell. — Stems suberect, $\frac{1}{2}$–1 ft. long, the slender root-fibres confined to near the base,

copiously pinnate,- the short erecto-patent branches copiously compound. Leaves of the lower plane ascending, contiguous on the branchlets, oblong, acute, a line long, bright green, membranous, nearly equal-sided, narrowed to the base, which is neither ciliated nor at all imbricated over the stem; leaves of the upper plane more than one-half as long, oblique oblong, with a large cusp. Spikes copious, slender, $\frac{1}{2}$–1 in. long, $\frac{1}{2}$ lin. diam.; bracts ovate, cuspidate.

Hab. Bombay Ghauts and Neilgherries, *Hohenacker* 83 a! *Perottet* 1386! *Jacquemont* 689! Pegu, *Scott*! (a form with a short cusp to the leaves of the upper plane).

177. S. PENNATA Spring Mon. ii. 257. — *S. crassicaulis* Spring Mon. ii. 172. — *Lycopodium pennatum* D. Don. — *L. crassicaule* Hook. & Grev. — Stems reaching a foot or more in length, erect, stout and conspicuously sulcate, copiously pinnate, the ascending branches elongated and very compound. Leaves of the lower plane contiguous on the branchlets, erecto-patent, pale green, membranous, oblong, acute, a line long, nearly equal-sided, not ciliated, not at all imbricated over the stem at the base; leaves of the upper plane one-half as long, oblong, acute. Spikes copious, square, $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{1}{2}$ lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Himalayas of Nepaul, *Wallich*! (mixed in Herb. Ind. under No. 123 with *S. fulcrata*). Habit of *S. chrysorhizos*, but the bracts uniform.

178. S. MERGUINA Spring Mon. ii. 81.—Stems suberect, slender, 3–4 in. long, sulcate down the face, the slender root-fibres confined to its base, closely pinnate, the ascending branches simple or slightly compound. Leaves of the lower plane contiguous on the branches, rather spaced on the main stem, oblong-rhomboid with a point at the upper corner, $\frac{1}{8}$–$\frac{1}{6}$ in. long, pale green, very membranous, unequal-sided, broadly rounded, not ciliated, and imbricated over the stem on the upper side at the base; leaves of the upper plane very small, broad ovate, with a cusp as long as the lamina. Spikes short, square, $\frac{3}{4}$–1 lin. diam.; bracts ovate, acute, strongly keeled.

Hab. In Tenasserim, at Mergui, *Griffith*! Habit of *S. tenera*, but the bracts uniform.

179. S. POULTERI Hort. Veitch. — Stems densely tufted, very slender, suberect, 2–3 in. long, three or four times dichotomously forked, with slender radicles from the lower half. Leaves of the lower plane distinctly spaced, spreading, suborbicular, obtuse, $\frac{1}{2}$ line long, bright green, moderately thick in texture, more produced on the upper side of the midrib, broadly rounded and shortly ciliated on the upper side at the base, and a little imbricated over the stem; leaves of the upper plane nearly as long, but ovate, acute, ascending. Spikes slender, $\frac{1}{2}$–1 in. long, $\frac{1}{2}$ lin. diam.; bracts ovate, acute, lax, scarcely longer than the sporangia.

Hab. Azores, introduced into cultivation by Messrs. Veitch about 1868. Leaves resembling those of *S. delicatissima*, but habit totally different.

180. S. ABYSSINICA Spring. Mon. ii. 99.—Stems weak, suberect, very slender, 3–4 in. long, copiously pinnate, the ascending branches sparingly or copiously compound. Leaves of the lower plane spaced even on the branchlets, the lower spreading, the upper ascending, oblong-lanceolate, acute, a line long, pale green, membranous, unequal-sided, broadly rounded, shortly ciliated, and imbricated over the stem on the upper side at the base; leaves of the upper plane one-half as long, ovate, cuspidate. Spikes short, square, ½ lin. diam.; bracts ovate, acute, sharply keeled.

Hab. Mountains of Abyssinia, *Schimper* 1444! Clarence Peak, Fernando Po, alt. 8000 ft., *Mann* 667! Either this or *S. versicolor* is probably *Lycopodium Myosurus* of Swartz, gathered by Afzelius at Sierra Leone.

(To be continued.)

SHORT NOTES.

PILAIRA CESATII, Van Tieg. — With reference to Mr. Grove's discovery of *Pilaira Cesatii* Van Tieg. (*ante*, p. 132) I may say that in November, 1880, I met with this mould in abundance upon Hayes Common, near the 'Fox' Inn, but have not found it since. It is probably a widely diffused form for which mycologists should be on the look out. Mr. Grove follows Van Tieghem in separating this species from *Pilobolus*, a course which has something to recommend it, but perhaps more to disapprove of. I got no zygospores, nor any example of Mr. Grove's second species. — SPENCER LE M. MOORE.

NEW SURREY PLANTS. — The following species, additional to those recorded in Top. Bot., ed. ii., have now been found in Surrey:—*Hypericum dubium* Leers, *Sanguisorba officinalis* L., *Potamogeton nitens* Weber, found by Mr. E. Straker (see Hooker's 'Student's Flora,' ed. iii., p. 432), *P. decipiens* Nolte, *Scirpus pauciflorus* Lightf., *Carex* "*fulva*." I have also received the last from the Rev. E. S. Marshall; the exact form to which it belongs is not yet determined. I have also confirmed the occurrence of *Carex dioica* L. and *C. strigosa* Huds., included in Top. Bot. on printed authority only. A single specimen of the *Hypericum* was found by me two years ago, but I deferred recording it in the hope of meeting with further examples, and when out with Mr. Arthur Bennett in August last several plants were found by him near the River Arun. This is certainly a very rare species in Surrey.—W. H. BEEBY.

BUCKINGHAMSHIRE SPHAGNACEÆ. — The following species and varieties of *Sphagnum* occur near Little Brickhill on the Lower Greensand range of hills. Duplicates have been critically examined by Messrs. Boswell, Hobkirk, and West, and an illustrative set is sent for the British Museum Herbarium:—*Sphagnum acutifolium*

Ehrh., vars. *deflexum* and *lilacinum*, *S. intermedium* Hoffm., *S. rigidum* Schpr., var. *compactum*, *S. subsecundum* Nees, vars. *contortum* and *auriculatum*, *S. tenellum* Ehrh., *S. cymbifolium* Ehrh., vars. *congestum* and *squarrosulum*.—J. Saunders.

Mentha pubescens *var.* palustris in Worcestershire.—This fine mint is growing upon the bank of Leigh Brook, in the parish of Alfrick, where it was gathered by my friend Mr. Alfred Waller and myself on August 27th. It forms considerable and conspicuous patches, *M. sativa* and *M. hirsuta* growing near.—R. F. Towndrow.

Zostera nana in N. Lincoln.—Mr. Searle, of Ashton-under-Lyne, has sent me specimens of the above plant gathered this year at Cleethorpes, N. Lincolnshire, "about 150 yards from the shore; only a few plants were seen." There is no record of this plant on the east coast between Durham and W. Sussex, even *Z. marina* not appearing as a Lincolnshire plant in the 2nd ed. of 'Topographical Botany.'—Arthur Bennett.

A Correction.—In noticing the 4th edition of Henfrey's 'Elementary Course of Botany' (p. 285) you quote a paragraph from the preface, for which I am responsible, in which it is stated that the whole of the sections relating to the Cryptogamia were *rewritten* by Mr. A. W. Bennett. This statement was written inadvertently, and, as it stands, might be thought to be unjust to Mr. George Murray. The whole of the proof-sheets relating to the cryptogams were, in fact, revised, and to a large extent rewritten, by Mr. Bennett; but those relating to the Fungi (which were recast for the preceding edition by Mr. George Murray) were comparatively little altered or added to, so that in the main they remain as in the former edition. I regret that Mr. Murray's engagements did not permit him to accede to my request to revise this portion of the work himself.—Maxwell T. Masters.

Shetland Plants.—*Eryngium maritimum* is recorded as doubtful for Shetland in 'Topographical Botany,' though Edmonston gives two localities, *viz.*, near Tanwick, North Mavin, and east shores of Bressa. The Rev. W. E. Smith has this year sent it from Fitful Head, in the southern part of the mainland. The same collector sends also a very small-flowered form of *Veronica officinalis* approaching *V. hirsuta* Hopkirk (of which the specimens, figured in 'Eng. Bot. Suppl.,' t. 2673, are in the herbarium of the British Museum), but with broader leaves. Probably this is the plant referred to by Edmonston in a manuscript account of the plants of Shetland, preserved in the Natural History Museum, in the following terms:—"The true *V. officinalis* is not common in Shetland, while what I think is an undescribed variety grows everywhere among loose or stony soil. The plant differs from the true *V. officinalis* in several remarkable points, *viz.*, the leaves are *not serrated*, and both them and the stem want the peculiar pubescence which the other possesses; the leaves are *sessile*, opposite, and rigid; and lastly, the capsule seems more distinctly winged."—H. N. Ridley.

Saxifraga Hirculus in Ireland.—The Rev. S. A. Brenan's rediscovery of this plant (p. 278) in the old station where the late Dr. Moore found it nearly fifty years since is of much interest. Still more interesting, in this connection, is the fact that three weeks previously, July 8th, a new station for *S. Hirculus* was discovered by Mr. R. L. Praeger, of Holywood. The locality is on the elevated plateau behind Garron Point, Co. Antrim, some fourteen miles east of the original station. Mr. Praeger describes the plant as plentiful here, growing with *Drosera anglica*, *Menyanthes*, and *Narthecium*. In these mountains of Antrim there are wide expanses of moorlands not yet sufficiently examined by botanists. —S. A. Stewart.

Callitriche obtusangula in Bucks.—This record is sent to show that this *Callitriche* occurs in all three counties of the Upper Thames, and will probably be found in most of the south-eastern and central counties. It occurred in Bucks, in the River Tove near Castlethorpe, the stream here forming the boundary of Bucks and Northamptonshire. On the western side of North Bucks it grew in the River Ouse, near Westbury, the river being the Oxford and Bucks boundary.—G. C. Druce.

Carex stricta in Northamptonshire and West Suffolk.—I met with this sedge at the end of last June in an interesting piece of marsh-ground formed by the White water, which rises near Stamford racecourse, and flows through Wittering Heath, and, passing near to Southorpe Quarries, is received by the Nene near Sutton. This marsh-land is now the only portion worthy of the name in Northamptonshire, and is especially noticeable from the profusion of *Juncus obtusiflorus* and *Schœnus nigricans;* growing sparingly with these by a ditch-side was *Carex stricta*, much less cæspitose in habit than I expected, and the filamentous sheaths not very noticeable. In *C. acuta* there is, when young, a filamentous sheath, which, however, is not persistent, and this may have led to the frequent mistaking of *C. acuta* for *C. stricta*. In E. B. plate *C. acuta* is drawn so as not to show the sheath, but, if the drawing of the filamentous sheath of *stricta* be correct, the reticulations differ from those of *acuta*. In Oxfordshire I have also seen tufted *acuta*. In West Suffolk *Carex stricta* grew on the bank of one of the fen-dykes between Lakenheath Village and the Station. Both the above records are additions to Top. Bot.—G. C. Druce.

Bees and Erica cinerea.—Mr. J. T. Powell records (p. 278) the biting of the corolla of *Erica cinerea* by species of *Bombus*. The humble-bees, however, are not the only insects which attack the plant. Last year, near Killarney, I found a somewhat rare beetle, *Carabus glabratus* Payk., employed in extracting the honey from it in the same manner. In this case of course it would be impossible for the insect to obtain the honey in any other way, on account of the shortness of its tongue. The beetle was fairly abundant, and the majority of the flowers of *E. cinerea* in the Mangerton Valley were pierced; but it is quite possible that much may have been done also by *Bombi*. I found no flowers of *E. Tetralix* thus attacked. —H. N. Ridley.

HIERACIUM BOREALE IN THE TEIGN VALLEY.—The Rev. W. Moyle Rogers is mistaken in stating, in his "Flora of the Teign Valley" (Journ. Bot. 1882, p. 180), that *Hieracium boreale* or *sabaudum* does not grow in the district. I have gathered it on a hedge-bank (right-hand side) about a mile out of Manaton Village towards Chagford; the dark involucres make it very conspicuous. It only grew for a few yards along the hedge (but in fair quantity), and then stopped as suddenly as it began. I have seen it nowhere else in the Dartmoor district.—F. B. DOVETON.

NOTICES OF BOOKS.

THE last number (issued in August) of the 'Icones Plantarum' contains, in addition to numerous new species, figures and descriptions of *Northea* Hook. f., a new Seychellan genus of *Sapotaceæ*, founded on *Mimusops? Horneana* Hartog (Journ. Bot. 1879, 358) and commemorating Miss Marianne North, and *Holubia* Oliv., a new genus of *Pedalineæ* from South Africa.

A NEW serial has made its appearance, edited by Prof. Pirotta, and entitled 'Annuario del R. Istituto Botanico di Roma.' The first fascicle (of 159 pp. 4to) contains the following papers:—R. Pirotta, 'Sulla struttura del seme nelle Oleacee' (5 plates); A. Baldini, 'Sul tallore di alcune Cucurbitacee' (3 plates); P. Baccarini, 'Osservazioni anatomiche sopra alcuni riceltacoli fiorali' (5 plates), and 'Intorno ad una probabile funzione meccanica dei cristalli di ossaluto calcico' (1 plate); M. Lanzi, 'Fungi in ditione Floræ romanæ enumerati' (1 plate); F. Tamburlini, 'Prima contribuzione alla Lichenografia romana' (1 plate).

NEW BOOKS.—J. SASSENFELD, 'Trierische Flora' (Trier, Lintz: 8vo, pp. iv. 164, 112 cuts).—L. M. GAUTIER, 'Les Champignons' (Paris, Baillière: 8vo, pp. xvi. 508: 16 plates, 195 cuts).—G. VENTURI & A. BOTTINI, 'Enumerazione critica dei Muschi Italiani' (8vo, pp. 79: Varese, Malnati).—T. B. BRISSON, 'Catalogue des Plantes Phanérogames du département de la Marne' (8vo, pp. 160: Chalons).—G. v. HOFFMANN, 'Untersuchungen über Spaltpilze in menschlichen Blute' (8vo, pp. iv. 82: 2 plates: Berlin, Hirschwald).—W. G. SMITH, 'Diseases of Field and Garden Crops' (8vo, pp. xxiv. 353; 143 figs.: Macmillan & Co., 4*s.* 6*d.*).—A. GRAY, 'Synoptical Flora of North America,' vol. i. pt. ii. (*Caprifoliaceæ–Compositæ*), 8vo, pp. 474: New York, Ivison, Blakeman & Co.).

ARTICLES IN JOURNALS.

American Naturalist.—A. F. Foerste, 'Fertilization of *Lophanthus nepetoides*.'

Bot. Centralblatt (Nos. 35–39).—F. Heyer, 'Beiträge zur Kenntniss der Farne des Carbon und des Rothliegenden im Saar-Rhein-Gebiete.'

Bot. Jahrbücher.—O. Drude, 'Ueber die verwandtschaftlichen Beziehungen von *Adoxa* zu *Chrysosplenium* und *Panax*.'—A. Peter, 'Uber spontane und künstliche Gartenbastarde der Gattung *Hieracium* sect. *Piloselloides*.'—O. Böckeler, 'Neue Cyperaceen.'

Botanical Gazette (Aug.). — L. H. Bailey, 'Notes on *Carex*' (*C. Halliana*, *C. rigens*, *C. multicaulis*, spp. nn.).—G. E. Davenport, Memoir of John Williamson († June 17, 1884, æt. 45).

Botaniska Notiser (haft 4). — A. W. Arnell, 'Anmäkningar angàende *Sorbus Aucuparia* L. f. *minor* Arnell.' — V. B. Wittrock, On *Erythræa*.—S. Almquist, 'Om Carex-slägtets phylogenesis.'

Bot. Zeitung (Sept. 12, 19).—L. Klein, 'Vergleichende Untersuchungen über Organbildung und Wachsthum am Vegetationspunkt dorsiventraler Farne' (1 plate).

Bull. Torrey Bot. Club.—N. L. Britton, '*Cyperaceæ* collected by S. B. Buckley in Texas and Mexico' (*Cyperus Buckleyi*, *C. oxycarioides*, *Heliocharis* (sic) *Texana*, spp. nn.).—H. H. Rusby, 'Michaux's New Jersey Garden.' — J. Schrenk, 'Germination of *Pardanthus chinensis*' (fig.).

Flora (Sept.). — C. Warnstorf, 'Sphagnologische Rückblicke' (2 plates).

Gardeners' Chronicle (Aug. 30).—*Calanthe Curtisii* Rchb. f., n. sp. —W. G. Smith, 'Disease of Primulas (*Urocystis primulicola*)' (figs. 52, 53). — (Sept. 6). Root fusion in *Pinus Pinaster* (fig. 58). — W. G. Smith, *Æcidium Berberidis* (fig. 60). — (Sept. 13). *Bravoa Bulliana* Baker, n. sp.—*Aciphylla squamosa* (fig. 61).—(Sept. 20). *Gymnogramma Lathamiæ* Moore, n. hybr. *Adiantum Fergusoni* Moore. —T. Meehan, 'Fertility of Hybrids.'—Memoir of George Bentham. —(Sept. 27). *Oncidium aurarium* Rchb. f., *Calanthe dipteryx* Rchb. f. spp. nn.—W. G. Smith, 'Fungus on ensilage.'

Grevillea.—M. C. Cooke, 'Fungi of Perak.' — Id., 'Synopsis Pyrenomycetum.'—Id. & W. H. Harkness, 'Californian Fungi.'

Knowledge (Sept. 5).—Grant Allen, 'Sunflowers.'

Midland Naturalist.—W. B. Grove, 'On the *Pilobolidæ*.'—J. E. Bagnall, 'Flora of Warwickshire' (*Lemnaceæ—Orchideæ*).

Naturalist. — G. C. Druce, 'A new variety of Cow-wheat' (*Melampyrum pratense*, var. *hians*).

Œsterr. Bot. Zeitschrift. — A. Hausgirg, 'Süsswasseralgen' (1 plate). — L. Celakovsky, 'Ueber *Stipa Tirsa*.' — V. v. Borbas, 'Samenreifende Doppelrosen.' — E. Formánek,' Flora der Beskiden' (cont.).—J. A. Bäumler, 'Mykologisches aus Pressburg.'—P. G. Strobl, 'Flora des Etna.'

We have only space to record the death of Mr. Bentham, which took place on September 10th. We hope shortly to give a full memoir of this eminent botanist.

NOTES ON THE STRUCTURE, THE OCCURRENCE IN LANCASHIRE, AND THE SOURCE OF ORIGIN, OF *NAIAS GRAMINEA* Delile, var. *DELILEI* Magnus.

By Charles Bailey, F.L.S.

(Plates 249—252.)

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I.—Introduction.

Naias graminea Del., Plate 249, fig. 1, and *Chara Braunii* Gmel. were first reported as occurring in a natural state in England at the Meeting of the British Association at Southport in September, 1883. Their addition to the flora of South Lancashire and of Britain is due to the Biological Society of Ashton, and to Mr. John Whitehead, of Dukinfield. They were discovered during the exploration of the Ashton-under-Lyne district in acquiring the necessary material for the compilation of a fauna and flora of the neighbourhood, for presentation to the Biological Section of the British Association. An abstract of this communication, made by Mr. J. R. Byrom, of Ashton, is printed on pp. 541–543 of the 'Report of the Fifty-third Meeting of the British Association.'

Few portions of Great Britain are so well known, botanically, as most of the northern counties of England, and yet a concerted systematic examination of so well-worked a district as Ashton has brought to light many novelties, besides two, if not three, plants not previously known to be British. To those who know what a large number of practical botanists there are in the North of England, and with what zest so many of their number pursue botanical studies in their hard-earned leisure, it has always seemed a matter for regret that so little of their accumulated knowledge finds its way into print; and the instance of what has been done by the Ashton botanists should stimulate other local societies to make similar efforts.

The actual discoverer of the *Naias* was Mr. James Lee, of Denton; he brought it to Mr. Whitehead, who sent it to me early in September of last year as a possible *Naias*, and, from plants which I afterwards gathered *in situ* with the discoverer and Messrs. Whitehead and Byrom, it was finally determined by Mr. H. N. Ridley, of the British Museum, to be *Naias graminea* Del. or *Caulinia alagnensis* Pollini. Subsequently Dr. Magnus, of Berlin, has given it

the varietal name of *Delilei*, on account of a structural peculiarity which will appear further on.

II.—The Genus and its Divisions.

The genus gives its name to the natural order *Naiadaceæ*, which is allied to the *Potamogetonaceæ*, but systematists are by no means agreed as to the respective limits of either family. Willdenow separated the group to which *N. graminea* belongs from *Naias* proper, under the generic name of *Caulinia*,* on account of the male flowers not having the quadrifid perianth of *Naias* proper; but Robert Brown reunited the two groups of *Naias* and *Caulinia* into *Naias* Linn. There is no doubt, however, that each of these divisions forms a very natural group sharply separated from the other by well-marked characters drawn from the leaf, stem, and fruit. All these points have been carefully worked out by Dr. P. Magnus in a work which he modestly entitled 'Beitrage zur Kenntniss der Gattung Najas, L.' (Berlin, 1870); and no one can investigate the morphology and anatomy of a plant of this genus without admiring the minute and conscientious investigations of this author. In preparing the following notes I have referred again and again to this memoir, and I cannot speak too highly of the help derived from it.

Dr. Magnus gives the following diagnoses of the two subdivisions of the genus, *viz.*:—

"§ Eunajas Asch.—Spine-teeth chiefly on the stem and backs of the leaves. Flowers dicœcious (? in all). Anther four-chambered (? always). Seed-shell consisting of a many-layered stony parenchyma. Conducting bundles of the stem divided from the intercellular spaces by two to three layers of parenchyma-cells. Leaf furnished with a small-celled epiderm, which rises very sharply from the large parenchyma-cells of the leaf.

"§ Caulinia Willd. — Spine-teeth absent from the stem and backs of leaves. Flowers in most species monœcious (? in all). Anther one- to four-chambered. Seed-shell formed of three layers of cellular tissue. Conducting bundles of the stem divided from the intercellular spaces by a layer of parenchyma-cells; leaf without the small-celled epiderm."—'Beitrage,' pp. 55, 56.

The plant which forms the subject of this notice belongs to the section *Caulinia*, and its synonymy and principal book-references are the following:—

III.—Synonymy of the Plant.

Najas graminea Delile, Flore de l'Egypte. Mémoire sur les plantes qui croissent spontanément en Egypte; par Alire Raffeneau Delile, p. 1. Floræ Ægyptiacæ illustratio No. 874, p. 75. Explication des planches, p. 282, pl. 50, fig. 3.

Chamisso, Aquaticæ quædam diversæ affinitatis. Linnæa, vol. iv., 1829, pp. 502–3.

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* 'Mémoires de l'Académie Royale des Sciences de Berlin, 1798, classe de Philosophie Expérimentale,' page 87.

Kunth, Enumeratio Plantarum, &c., Tom. iii., p. 115.
Boissier, Flora Orientalis, vol. v., p. 28.
Compendio della Flora Italiana compilato per cura dei Professori V. Cesati, G. Passerini, e G. Gibelli. Par. i., p. 205.
Najas alagnensis Pollini, Hort. et provinc. Veron. pl. nov. vel. min. cogn., p. 26. Flora Veronensis quam in prodromum Floræ Italiæ septentrionalis exhibit Cyrus Pollinius; Tom. iii., p. 49 (1824).
L. Reichenbach, Flora Germanica Excursoria, No. 920, p. 151.
Chamisso, Aquaticæ quædam diversæ affinitatis in Linnæa, vol. iv., p. 502 (1829).
Antonii Bertolonii, M.D., Flora Italica sistens plantas in Italia et in insulis circumstantibus sponte nascentes. Tomo x., fasc. iii., p. 296.
Naias serristipula Nocc. et Balb., Ic. Fl. Ticin., Tab. 15 ex specim. sicc. delineata.
Naias tenuifolia Aschers., Atti della Societa Italiana di Scienze naturali, pp. 267 & 268. Non R. Br.
Najas graminea Del., var. *Delilei* Magnus, Berichte der deutschen botanischen Gesellschaft; Band i., Heft 10, Jahr. 1883, pp. 522 & 523.
Caulinia alagnensis Pollini, Plant. Veron., 26.
Diar. Brugnatelli Giorn. ann. 1816, T. ix., p. 175.
Bluff et Fingerhuth, Compendium Floræ Germaniæ, Sectio i., ed. alt. ii., p. 585.
Flora Italiana, ... di Filippo Parlatore, vol. iii., pp. 665, 666.
Caulinia intermedia Balb., Elench. recentium stirpium, quas Pedemontanæ floræ addendas censet., &c.; in Mem. della R. Accad. di Tor. Ann. 1818, Tom. 23, p. 105.
Balb. et Nocca, Flor. Ticin., Tom. ii., p. 163, tab. 15.
Nocca, Clav., ii., p. 91.
Caulinia microphylla Nocc. et Balb., Flor. Ticin., Tom. ii., p. 163, tab. 16.

It still remains a question whether this plant should bear Delile's name, or Pollini's name, according as the one or the other had priority in publication, as has been pointed out by Prof. Ascherson in 'Atti della Societa Italiana,' vol. x., p. 267, where he shows that the description of the plant of Pollini was certainly published in 1814; whilst the Memoir of Delile, although perhaps printed in 1813, was not published until some later year. I cannot elucidate this point further, as my copy of Delile has no title-page, and my edition of Pollini's 'Flora Veronensis' is that of 1824. Pollini's herbarium-specimen of the Italian plant is preserved among the possessions of the Society of Naturalists of Rhenish Westphalia, in Bonn.

The Italian plant is not the same as Robert Brown's *Naias tenuifolia*, Prodr. Fl. Nov. Holland., p. 545, published in 1810, on account of the entirely different structure of the male flower (see Plate 251, fig. 15); otherwise the name would have taken precedence of Pollini's and Delile's.

Whether the plant found in Japan, at Yokohama, is identical with *Naias graminea* Del. is uncertain, but the description of it by Herr C. J. Maximowicz may stand for the Lancashire plant:—"Mollis elongata, foliis verticillatis patentibus rectis argute spinoso-serrulatis, apice 2–3 cuspidatis, dentibus incurvis 1-cellulosis minutis; stipulis distinctimus lanceolatis foliaceis folii ad instar serrulatis; fructu lineari-oblongo, granulato. Nippon, in fossis circa Yokohamam semel inveni fructiferam."*

IV.—The Stem.

The stems vary in length from a few inches to upwards of two feet, and they have many branches. Considering the large number of leaves which they support, the stems are comparatively weak; they do not vary much in diameter from the base to the summit; vertical sections of the upper internodes are not quite so circular as those of the lower internodes.

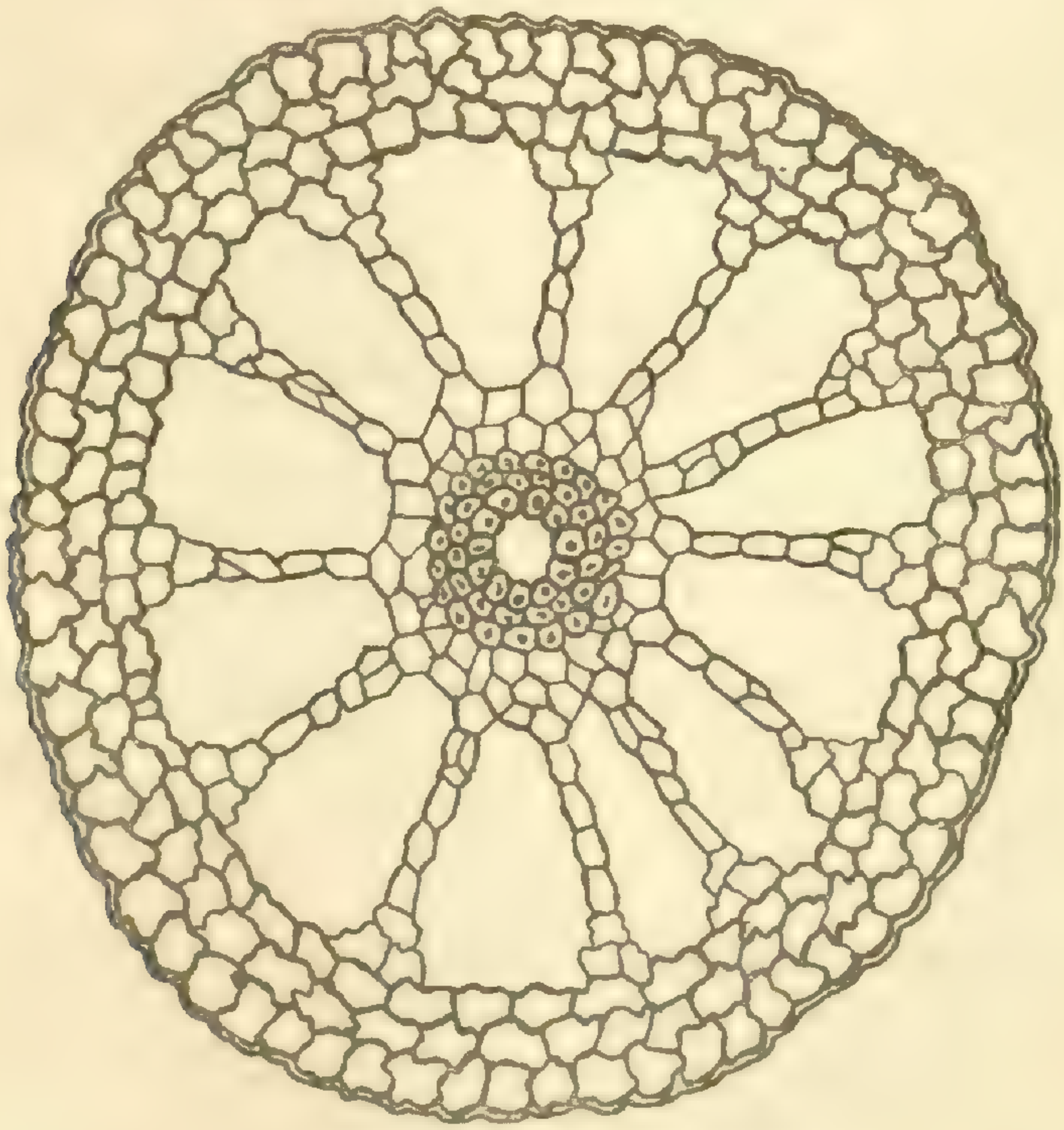

Fig. 42.

If we examine one of these internodes we find that the centre of the shaft consists of a small channel, surrounded by two or three layers of elongate cells somewhat closely aggregated; surrounding these is a layer of much larger cells, hexagonal in outline, and having thinner walls than those which protect the central channel. From this central mass radiates a series of from eight to twelve prolongations of the central hexagonal cells, meeting as many outgrowths from the tissue which forms the circumference of the internode, and arranged like the spokes of a wheel. See fig. 42.

* Diagnoses breves plantarum novarum Japoniæ et Mandschuria; in Bulletin de l'Acad. Imp. des Sciences de St. Petersburgh. Vol. ii., pp. 71, 72. 1867.

The rays enclose an equal number of large intercellular cavities, each cavity being bounded by the central and peripheral parenchyma at either end. The cavities occur in every internode, whatever its age, but they are limited in the direction of the axis by the node. The rays consist of a single row of cells, except at the points where they join the circumference and centre; they are not always as regular as they are drawn in fig. 42, as they occasionally branch at each end so as to enclose a smaller intercellular cavity.

The circumferential tissue of each internode consists of three or four rows of elongate cells having a hexagonal outline, with sinuous edges. The cells are all uniform in size, the outermost layer not being smaller than the rest, as it is in *Naias flexilis*. The external edge of the outer row of cells is slightly thickened, but I cannot detect any epidermal cells.

In the posthumous work of Prof. Parlatore, entitled 'Tavole per una "Anatomia delle piante aquatiche,"' a drawing is given of the transverse section of the Italian *Naias graminea*, but it differs from my drawing (fig. 42) in showing an epidermis of distinct square-shaped cells. The central bundle is also made to consist of about half a dozen rows of cells, smaller in size than I find them in the Reddish plant. I reproduce Parlatore's figure on Plate 252, fig. 36.

Chatin, in his valuable but incomplete work, 'Anatomie comparée des Végétaux,' did not quite reach the *Naiadaceæ* in the volume devoted to aquatic plants, or his drawings would have been useful for comparison; it is much to be desired that this fine work had been completed, as well for the parasitic plants as for the aquatic. The *Naidæ* are not yet figured by Reichenbach in his 'Icones Floræ Germanicæ et Helveticæ,' &c.

V.—The Leaves.

Fig. 43.

The leaves grow in tufts at the side of each internode, and they are rather more lateral than they are represented in Delile's figure, reproduced two-thirds the original size in Plate 250, fig. 3. In the living state, as seen in the water from above, they have a light olive-green shade, much duller than that of the bright green leaves of *Naias flexilis*. In the dried state they become much darker, particularly in the older leaves, but the younger tufts retain the light green colour of the living plant.

In shape the leaves are linear, broadly channelled in their lower portion (figs. 64 & 65), thickened in the region of the midrib (figs. 60 to 63), and slightly keeled on their lower surface; in length they vary from $\frac{1}{2}$ in. to $1\frac{3}{4}$ in., and they are 1-24th in. broad or less (see Plate 249, fig. 2). The sides of the fully-developed leaf are parallel for the greater portion of their length, but at their base they widen out into a broad sheath bearing two upright auricles applied to

Fig. 44.

the stem and half-clasping it (figs. 52 to 55). The extremity of the leaf is gradually attenuated, and ends in from one to three spines (fig. 43); the extremities are frequently truncate, so that the spines give it a cuspidate character (fig. 44).

The margins of the sides, sheath, and free extremity are studded with erect, unicellular, yellowish brown spines (figs. 47 to 49), whose colour presents a contrast to the transparent marginal cell-walls, and to the green contents of the cells of the lamina of the leaf. The spines are acuminate, slightly curved, and gradually narrowed from the base to the sharp point.

VI.—The Leaf-spines.

The form of the spine, or tooth, on the margin of the leaf furnishes good discriminating characters between the various species of *Naias*, as was long ago pointed out by the late Al. Braun in one of the earlier numbers of this Journal (vol. ii., 1864, pp. 274–279).

The simplest form of tooth is that of *N. flexilis*, where, in Dr. Boswell's Loch Cluny specimens, the base of the spine is in the same plane as the leaf-margin. The spine springs from a dilatation between two of the marginal leaf-cells (fig. 45), each of which nearly equally supports the spine to the extent of one-third its length, rarely more. Sometimes the two marginal cells are separated from each other by the spine (see fig. 46).

Fig. 45. Fig. 46. Fig. 47. Fig. 48. Fig. 49.

In *Naias graminea* the type of spine is similar, but it differs from that of *N. flexilis* in having a bi-celled base whose sides unequally support the spine. The lowermost of the two basal cells diverges, at its upper end, from the line of the leaf-margin, so as to wholly

support the lower end of the spine (see fig. 47). The uppermost cell, on the other hand, acts as a support to the inner side of the spine for fully one-half its length; it also partially underlies the upper end of the lowermost basal cell, and thus its three-sided profile fills up the axil of the spine and adds considerably to its rigidity, as compared with the arrangement in *N. flexilis* (comp. fig. 45). Occasionally a third cell makes its appearance, as shown in fig. 48, and not infrequently there is an auxiliary spine between the upper supporting cell and the original spine (see fig. 49). In all these cases, however, the axillary, or uppermost, basal cell distinguishes the type of tooth from the characteristic tooth of *N. flexilis*. Cesati gives figures of the dentition of these two species in Plate II. of 'Linnæa,' vol. xxxvi.; but he makes that of *N. alaganensis* much nearer to that of *N. flexilis* than I find it to be in the Manchester plant.

Fig. 50.

A third type of spine is furnished by *Naias minor* All. (*Caulinia fragilis* W.). This shows an advance upon the basal arrangement of the spines of *N. flexilis* and *N. graminea*, in being formed of more than three cells (see fig. 50). The entire tooth stands much above the line of cells which forms the margin of the leaf.

Upon comparing these figures (which I have carefully made from typical specimens) with those given by Braun on p. 275, vol. ii. of this Journal, it will be seen that my drawings present considerable variation from his, particularly in *N. flexilis*. It is possible that Braun's figures were meant to be diagramatic, and representative of groups rather than of species; for convenience of reference I have reproduced them in Plate 251, figs. 6 to 8.

The other end of the series of types of spines is represented by the tooth of *N. major*, where there is not only a multicellular base, but the spine itself is compound; one terminal dark brown cell resting upon several elongate dark brown cells, the whole forming a very conspicuous tooth standing well out from the plane of the leaf-margin. Fig. 51 gives a tooth of this species from one of the late Dr. Wirtgen's specimens from the mouth of the Moselle, near Coblentz.

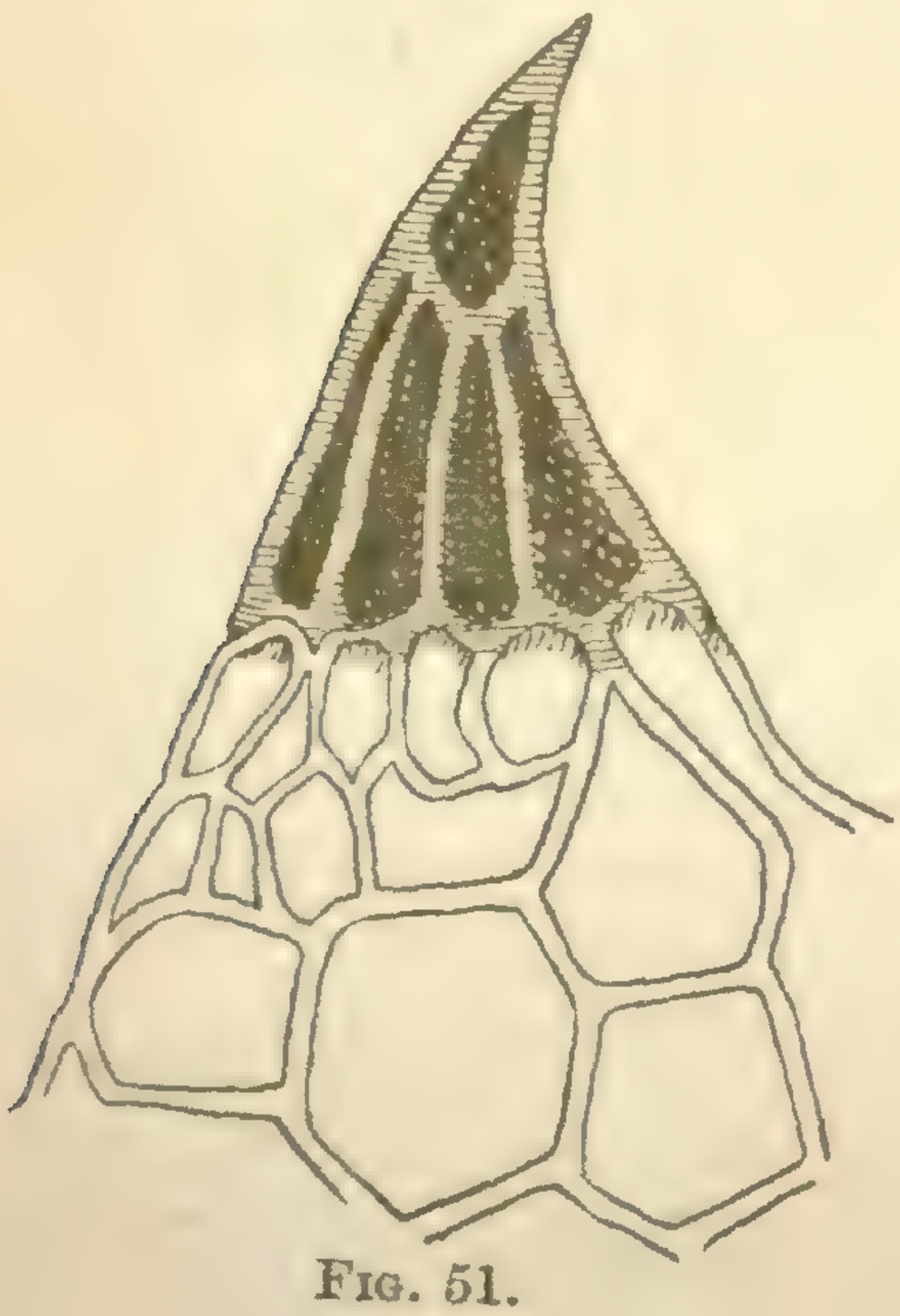

Fig. 51.

In *N. graminea* the spines are situated on the leaf-margins only (never on the midrib) at intervals equal to from one-half to the whole breadth of the leaf. Figs. 47 to 49 have been drawn from spines on the edge of the middle portion of the leaf. Their shape is constant on the sides of the lamina, but they become longer on the sheath, and at the apex of the leaf.

VII.—The Leaf-sheath.

The leaf-sheath is another important character in distinguishing the species of *Naiadæ*, the extent of the dilatation, and the form of the auricle, when present, furnishing useful marks of discrimination.

Fig. 52.

The types given by Braun in the 'Journal of Botany,' vol. ii., p. 274, are re-drawn on Plate 251. figs. 10 to 14, but, as will be seen from what follows, the Reddish plant differs considerably from Braun's figure of *N. graminea*, unless he meant it to serve as a general figure of the type of sheath in his super-species *N. tenuifolia*.

In the English *Naias graminea* the base of the lamina of the outermost pair of leaves suddenly dilates into a pair of upright auricles, or ears, which are continued below so as to form a more or less ample sheath (see fig. 52); the size of the sheath presents considerable variations, according to the age and the position of the leaf to which it belongs (see figs. 52 to 55). I see no trace of any intravaginal scales (squamulæ) at the base of the leaf-sheath, such as are found in *Naias major* and in the allied genus *Phucagrostis*. Fig. 29, Plate 251, shows the scales of *Naias major in situ*; one of the scales is drawn separately in fig. 30 on the same plate.

Fig. 53.

The auricles in their turn vary in shape and size, but I have not met

with them so regularly oval nor so acute as they are represented in Braun's figure (fig. 14, Plate 251); on the contrary, I never find them acute, and, though somewhat parallel-sided, they gradually taper from their base to their elongate truncate apex (see figs. 52 and 54). More often than not the auricle is larger on one side than the other, as in figs. 54 and 55. The auricles are confined principally to the first

Fig. 54.

Fig. 55.

pair of leaves of each fascicle, and the sheaths of the pair embrace the leaf; most often these are the only leaves in the fascicle which possess auricles (see Delile's figure on Plate 250, fig. 4). The next pair of leaves has auricles which, when present, form a more acute sinus with the lamina (fig. 55); but as we approach the centre of each fascicle the leaves are destitute of auricles, and pass into short lanceolate bracts, in the midst of which we find the flowers.

In Scotch specimens of *Naias flexilis* the leaf-sheath is of another type; the base of the limb widens out into a sheath more than twice the breadth of the limb, and at an angle of about 45°; but there is no approach to an auricle on either side. The shoulders of the sheath are crowded with teeth, but they are infrequent on the sides. See figs. 56 and 57, and

Fig. 56.

Fig. 57.

compare them with the slightly different figure of Braun on Plate 251, fig. 10.

For drawings of the leaf-sheaths of *Naias minor* and *N. major* see Plate 251, figs. 9 & 29, and compare the former with Braun's figure, Plate 251, fig. 11.

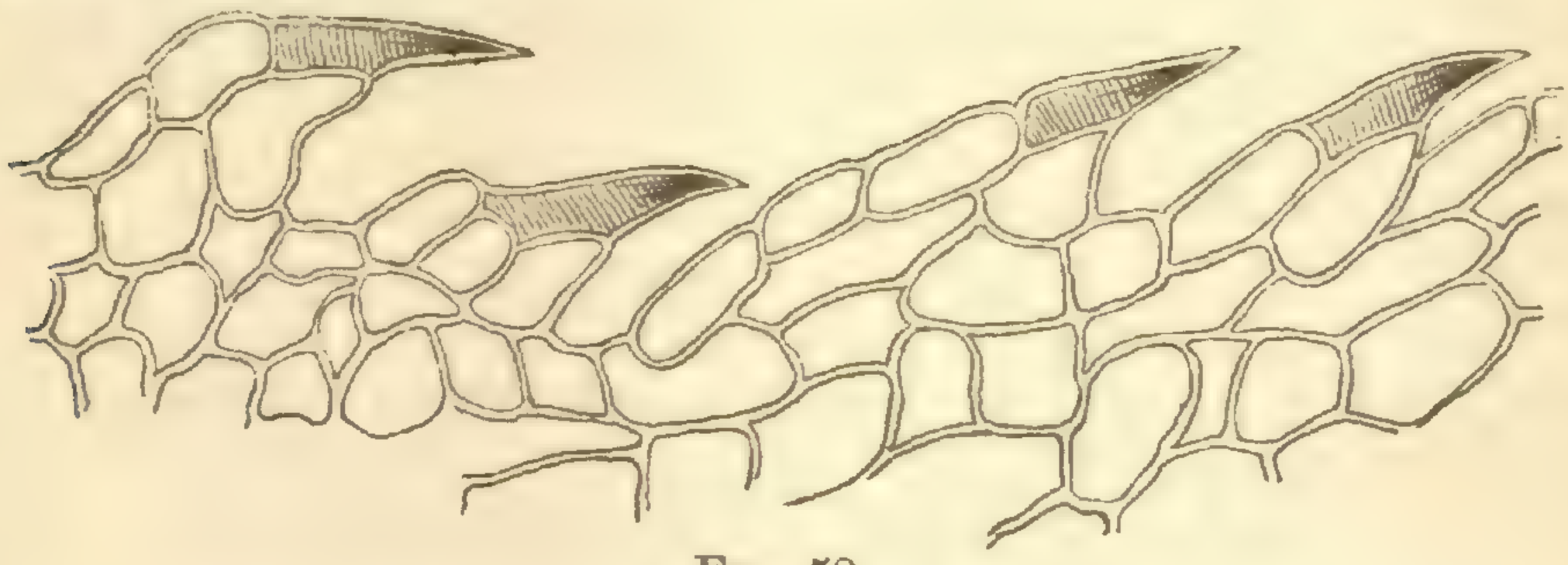

Fig. 58.

The margins of the auricles of *N. graminea*, and more particularly their free extremities and inner sides, are crowded with strong, spiny, tawny-brown cells, similar to those on the lamina; but they occur at much shorter intervals, and the cells at the base of the spines are more loosely aggregated (see fig. 58), so that there is no well-defined series of marginal cells as in the lamina. The basal cells which support the spines have their longest diameter in the direction of the spine.

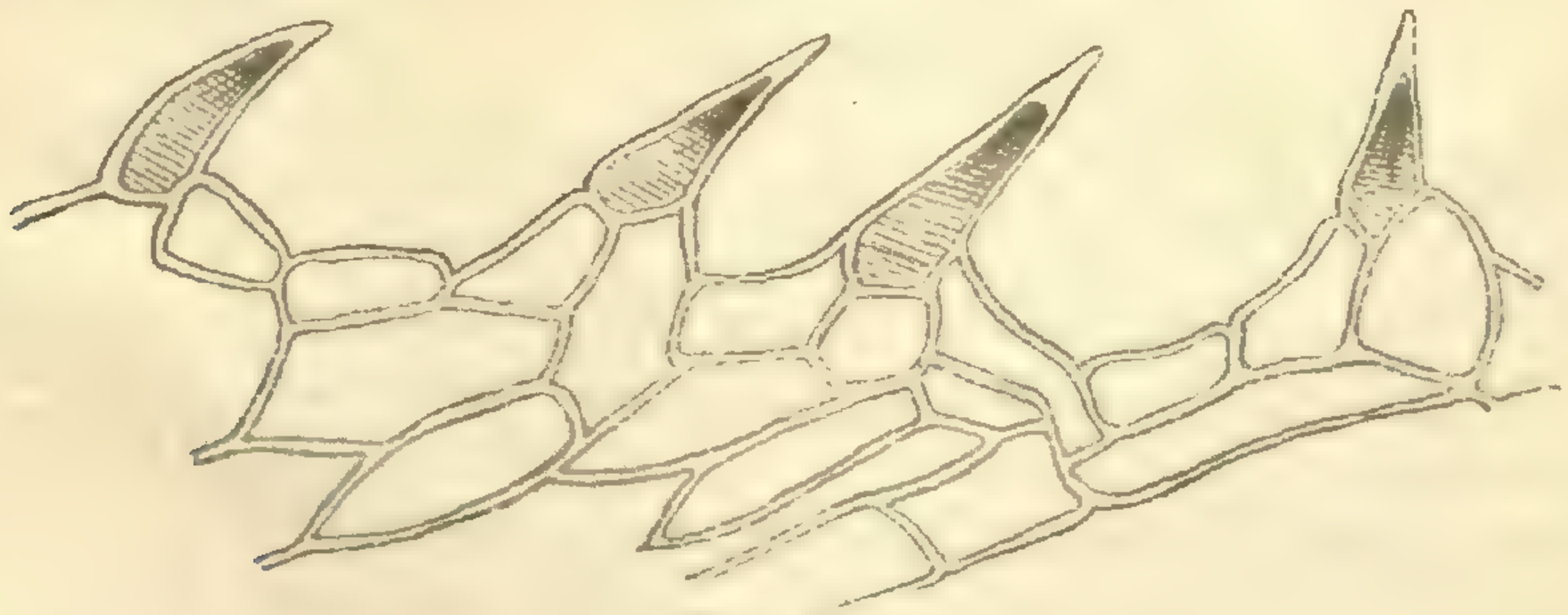

Fig. 59.

In *N. flexilis* (fig. 59) the cells are more loosely aggregated also, but the line of marginal cells, though not so well-defined as in the lamina, is more clearly apparent than it is in *N. graminea*. The cells of the sheath, as well as the marginal cells of the lamina, of *N. flexilis* are larger and longer than they are in *N. graminea*; but the two species may be distinguished by the length of the imbedded portion of the spine, which in *N. flexilis* is less, and in *N. graminea* is more, than one-third of its free length. The leaf-cells of *N. flexilis* generally are larger than those of *N. graminea* (compare figs. 45 and 46 with figs. 47 to 49, and fig. 58 with fig. 59, all of which are drawn to the same scale).

VIII.—Leaf-structure.

The anatomy of the leaves of *N. graminea* is simple. The margins of the lamina to the extent of one-third the breadth are composed of two layers of cells (see figs. 63 and 65), which in the Reddish specimens do not present that contrast in the size of the cells of

the superior and inferior layers which Dr. Magnus mentions on p. 51 of his 'Beitrage.' No doubt the cells of the convex side of the lamina are slightly the smaller, but the difference is not so marked as they are represented in Plate 252, figs. 31 to 33, which are copied from the figures given by Dr. Magnus.

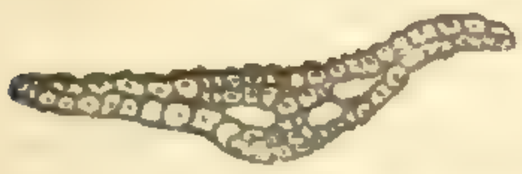

Fig. 60.

Fig. 61.

Fig. 62.

Fig. 63.

Fig. 64.

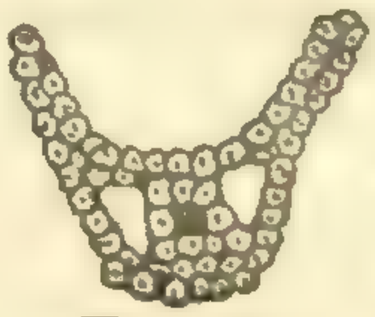

Fig. 65.

There are no stomata on the leaves, and no epidermis; but the surface-cells in all parts of the plant have intermixed with them reddish pink pigment-cells, which become brown with age. They are probably resinous, as they are the last to decay; similar cells occur in other species of *Naias*.

The central portion of the leaf is much thicker than the sides, because at this point the two layers of the lamina diverge from each other so as to enclose a central bundle of small-sized cells, surrounded by a layer of six or eight larger-sized cells. On either side of this central tissue are two intercellular cavities, which greatly exceed in size the cells which bound them (see figs. 60 to 65).

In his 'Beitrage,' pp. 51 and 52, Magnus describes *Naias graminea* as possessing bast-cells in certain fixed positions in the leaf, namely, close to the margin, and immediately above and below the central bundle on the upper and lower surfaces of the leaf (see figs. 31 to 33 on Plate 252). These bast-cells I cannot discover, after prolonged search, in any portion of the Reddish plants; but as Magnus states (p. 52) that Damietta specimens collected by Ehrenberg, and Cairo specimens collected by Schweinfurth, also have these bast-cells wanting, it is clear that the Reddish plant corresponds in this particular with the plants from Lower Egypt.

On the other hand, the plant from the Italian stations possesses bast-cells. I found them clearly marked in specimens in my herbarium collected by Signor Malinverni, "In stagnis fossis et oryzetis circa Quinto Vercellensis ditionis pago æstate 1875"; the accompanying figure has been drawn from the leaf of one of these plants (fig. 66).

Fig. 66.

The line of libriform cells is the central one of the three series which I have drawn; it is most clearly apparent when viewed as a transparent object, from the circumstance that its cells do not contain chlorophyll, and hence it is visible as a transparent colourless line in the midst of green tissue.

An isolated bast-cell is given in fig. 34 on Plate 252, and their position in the leaf is shown in figs. 31 to 33

on the same Plate at the points marked *b*. In the upper part of fig. 32 the single cell seems to have been multiplied into three, but, as Dr. Magnus explains in his memoir, these long Y-shaped cells are arranged in a single linear series at the edge of the leaf; the bifurcating end of one cell encloses the solitary attenuated end of the one next to it; a section at such a junction severs the three interlocked ends of two contiguous cells.

The absence of this libriform tissue in the Lancashire plant has a bearing in determining its source of origin, as will be noticed further on.

Between the Italian and the Lancashire plants I notice one other point of difference, which may be due to the period of growth. Above and below the central bundle of the leaf, but particularly on the lower surface, the external cells are densely packed with starch-grains, very similar to what is met with in the external membrane of the fruit. Although starch-granules are present in the membrane of the fruits of the Lancashire plant, I have failed to discover a single instance of their occurring in quantity in the leaves.

All the cells of the leaf exhibit a very striking circulation of their contents against the cell-walls; the chlorophyllean granules and other protoplasmic bodies being very large, and the cell-walls being very transparent, the plant furnishes a splendid illustration of circulation, more so than in any plant which I have examined.

IX.—The Inflorescence.

The construction of the flowers of the genus *Naias* and their morphology have been minutely studied by Dr. Magnus, and the results given in his 'Beitrage,' pp. 26 to 33. In referring to the development of a side-shoot of *N. graminea* he says that many of the internodes are suppressed, and that from three to five pairs of leaves spring from the axis before we reach the flowers, which occur to the number of from two to four all in one node. He adds that it is worthy of notice that the male flowers are found on those parts of the shoots which have long internodes, while the female flowers occur only on those shoots where the internodes are suppressed.

Fig. 67.

This was not the structure in the Lancashire plant. Quite as often as not pistilliferous flowers were found in the axil of the first pair of leaves of the tuft. Antheriferous and pistilliferous flowers are found side by side (see figs. 67 and 68) in the axil of the same leaf. Both kinds of flowers are also found in all stages of development, quite young ones lying side-by-side with those more developed.

The great majority of the plants produced fully-developed flowers, both male and female, the latter being much the more numerous. The species is monœcious; even in those instances in which I found only female flowers on the individual plant, I could not be sure that male flowers had not been produced, or would not have been produced later on. It was not usual, though by no means infrequent, to find both

sexes in the same fascicle, at equal stages of development (figs. 67 and 68), and mature and immature flowers enclosed by the same bract (see figs. 81 and 86).

Fig. 68.

The flowers begin to occur immediately within the axil of the first pair of leaves in each fascicle, but there is frequently an outlying pair of leaves below the fascicle which does not contain flowers. The oldest flowers are always at the base of the fascicle. When mature, the fruits are plainly visible to the naked eye (see Delile's figure on Plate 250, fig. 4), but they can be detected, when present, by the touch. The female flowers are rarely solitary, but occur in twos, threes, or fours; in the earlier stages of development they are sometimes more numerous. The male flowers are more often solitary. In the centre of the fascicle are the youngest flowers (see figs. 68 and 69).

In appearance the flowers look as if they were ordinary anthers and pistils, *i.e.*, that they possess no perianth; but Dr. Magnus has shown that their outermost covering is really a perianth which more or less closely invests the anthers and pistils. In fig. 16 on Plate 251 the perianth has been drawn back from the exposed anther of *N. major*. Figs. 22, 24, 25, and 28 show the natural reflexion of the perianth-leaves in the male flower of *N. major*.

All the flowers are sessile, and I have endeavoured to convey, in the accompanying figures, accurate representations of each.

Fig. 69.

X.—The Pistilliferous Flower.

The female flower consists of an elongate flask-shaped body, with a long neck which bifurcates at its free end (figs. 68 and 70), like the bifid stigma of a *Carex*, such as *C. ovalis*. The outer covering is the perianth; the body which it encloses is the pistil.

Fig. 70.

In its early stage the lower, or flask-shaped, portion consists of a globose or ovate body, surmounted by a flat parallel-sided band, of nearly the same breadth as the lower portion (fig. 67). The upper portion or neck of the flask divides about half-way up into two divisions, like the stigma of an ordinary flowering plant (see fig. 71). This stigmatoid portion attains its maximum length very early. The basal portion contains a single anatropous ovule, and it enlarges both outwards and upwards until it is twice the length of the style-like portion (see fig. 70).

The investing membrane (fig. 88)—which can be removed like the calyptra of a *Polytrichum*—is made up of one or two layers of cells, which vary in shape according to their position. The portion which covers the ovule consists of elongate cells with truncate ends, and these cells are densely packed with rounded grains of starch very uniform in size. The starch makes its appearance in the later stages of the growth of the membrane. The portion which covers the long neck of the flask-shaped body is also mostly composed of long cells; but the cells which occur on the margins of the stigmatoid divisions of the free ends are only one-third the length of the central cells, and their outer ends are somewhat enlarged so as to make the edge of the stigmatoid divisions minutely papillate, as if to afford better attachment for the grains of pollen (fig. 72). The cells of the base of the neck are much broader than any of those in other parts of the investing membrane, and they are also more loosely aggregated at that point.

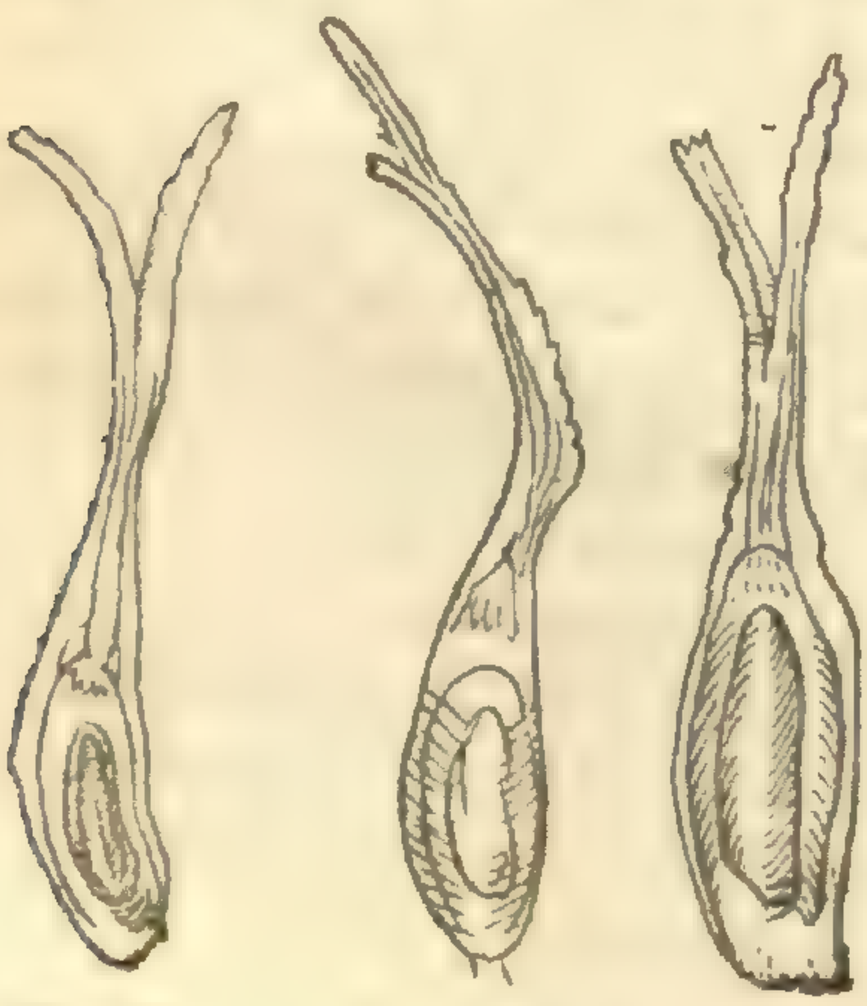

Fig. 71. Fig. 72. Fig. 73.

A central canal runs throughout the narrow portion which simulates the style, and at the point where it reaches the chamber which contains the ovule it becomes slightly constricted (fig. 71); but immediately below the constriction it widens out into a cupola-shaped cavity, whose upper portion or roof is lined with a few unicellular hairs (figs. 72 and 73). Below this cavity is the ovule. The accompanying drawings (figs. 67 to 73) illustrate the female flower in some of its stages of development.

No portion of the pistilliferous flower bears any spines similar to those which occur on the bracts and leaves; such spines are present in some of the species of *Naias*.

XI.—The Antheriferous Flower.

The male flowers are not so numerous as the female flowers, and they grow intermixed with them. Although I have frequently found plants of *Naias graminea* in which none but pistilliferous flowers could be detected at the period of examination, such tendency towards diœcism never showed itself when anther-bearing flowers were present. When the latter occurred on a plant pistilliferous flowers were invariably present, and oftener than not side by side with them (see figs. 67 and 68).

My observations of the anther do not quite coincide with the descriptions and figure given by Dr. Magnus; I have consequently given a larger number of illustrative drawings of these organs. The drawing of Dr. Magnus is reproduced on Plate 252 in fig. 35.

Fig. 74.

When young they are oval-shaped bodies borne upon a very short stalk (see figs. 74 and 76). So much do they resemble the anther of an ordinary flowering-plant that I was a long time in realising that the outer body which I was examining was the membrane which formed the perianth. The perianth closely invests the anther throughout all its stages of growth, and, from all that I have seen, it keeps pace uniformly with the growth of the membrane of the anther.

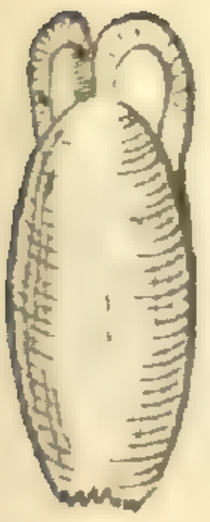

Fig. 75.

The anthers of this genus, according to Dr. Magnus, are axis-growths which, when ripening, are pushed through the perianth, rupturing that membrane somewhat irregularly, and they finally dehisce at their apex. That the anthers of the Reddish plant dehisce at the apex there is no doubt, but I have seen no trace of the rupturing of the outer perianth-membrane through the emergence of the anther proper; on the contrary, the summit of the flower presents a regularity of parts for which Dr. Magnus's observations did not prepare me. The rupturing of the perianth in *N. major* is shown in figs. 22 and 28 on Plate 251.

Fig. 76.

In an early stage the antheriferous flower of *N. graminea* has its outer membrane prolonged into two erect rounded ears, which are continued down the sides as keels or ridges (figs. 67 and 75). The young pollen at this stage is distinctly seen through the membranes of the flower and of the anther (fig. 76). The anther then becomes more elongate by its upward growth; a slight groove makes its appearance longitudinally, corresponding with the principal dissepiment of the anther (fig. 68); the upright ears and the keels lose their prominence, and the separate pollen-grains are not so distinguishable (fig. 77). Finally, the mature quadrilocular anther is an ovoid cylindrical body having two narrow ridges covering the summit, and descending about half-way down the covering of the flower (fig. 78). For comparison, see an antheriferous flower of *N. minor* in Plate 251, fig. 17; a transverse section of *N. major* in fig. 18; a vertical section of *N. major* in

Fig. 77.

Fig. 78.

fig. 23; a vertical section of *N. minor* in fig. 27; and a vertical section of *N. major*. in fig. 21.

The membrane which invests the anther is formed of close-ranked, elongate, translucent cells, six to twelve times as long as broad, and tinged with a beautiful rose-colour; the superposition of this rosy membrane over the lemon-coloured pollen of the anther gives the flower a tawny-orange appearance, which readily attracts notice, even without the aid of a lens. The cells which compose the ridges in the upper half of the flower are larger and broader than those of the rest of the membrane.

Robert Brown's *N. tenuifolia* has considerable affinity with the Manchester plant, but, independent of other differences, the anther is very dissimilar on account of its external tunic terminating in a narrow elongate beak, which bears a number of brown spiny teeth at its free end (see fig. 15, Plate 251). At the period of dehiscence the internal tunic which contains the pollen separates itself from the external membrane, but, instead of its emerging through the summit of the beak of the perianth, it is thrust through a rupture in the side.

In *N. graminea* the external membrane closely invests the inner membrane, but it is not projected beyond it in the form of a beak; and I have not seen a vestige of a brown spiny cell on any portion of the male flower.

XII.—The Pollen.

The pollen of the various species of *Naias* does not seem to have been much noticed by observers. Magnus does not allude to it, nor give any figures of pollen-grains for any of the species; and contradictory statements are made by some authors. Thus the drawings of Braun, engraved in fasc. x., plate i., of the 'Genera plantarum floræ germanicæ' of Nees ab Esenbeck, show a globose pollen for *Naias minor* (*Caulinia fragilis*) *in situ*, and for *Naias major* in separate grains (see Pl. 251, fig. 19), and in his diagnosis of the genus (*Caulinia*) he specifies "pollen globosum, magnum." This statement seems to be the foundation for the similar statement in the works of later authors, one of the most recent being given in the 'Genera plantarum' of Bentham and Hooker, vol. iii., p. 1018, *viz.*, "pollen globosum." In the 'Compendio della Flora Italiana' of Cesati, Passerini, and Gibelli, part 1, p. 204, tab. xxvii., fig. 1, the pollen of *N. major* is elliptico-cylindrical like a grain of rice, say from two to three times longer than broad (see Pl. 251, fig. 26). In the 'Flora Danica,' Plate 2121, the pollen of *Najas marina* (*Caulinia fragilis*) is of an elliptical form, not quite twice as long as broad.

This divergence of form in the pollen-grain of *Naias major* suggests at first sight inaccuracy of observation, but I have found both globose and elongate pollen in the anthers of the Lancashire *Naias graminea*. The globular form is represented in fig. 79, and the elliptical form is given in fig. 80, both drawn to the same scale.

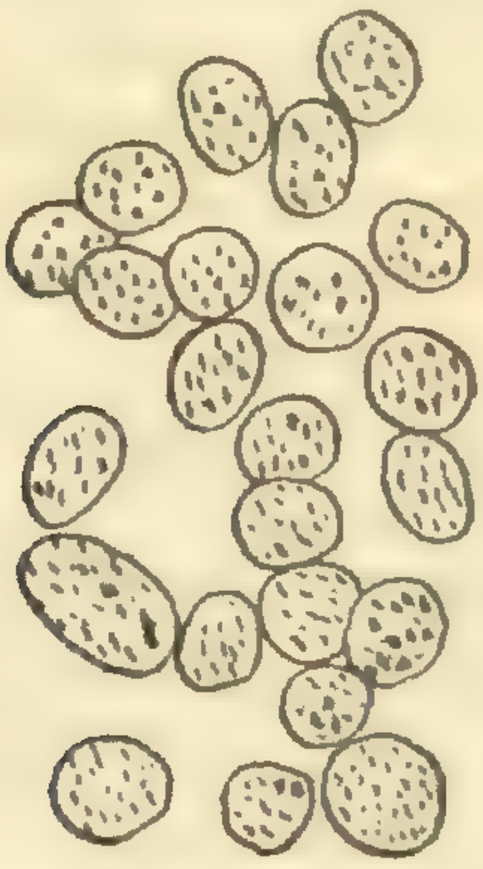

FIG. 79.

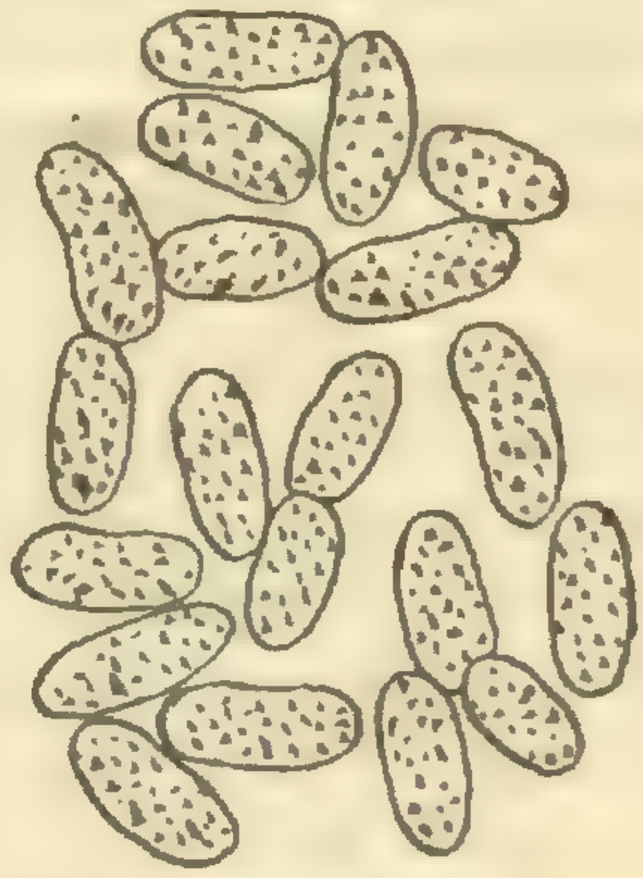

FIG. 80.

Undoubtedly the pollen is globular in its early stages, but, after selecting what appeared to be perfectly mature anthers just at the period of dehiscence, the pollen which emerged was found to be globose, as drawn, in one anther, and elliptico-cylindrical in another anther. Whether the globose pollen ultimately passes into the elliptical form, and that the latter represents the mature pollen, or whether there is a dimorphism in the pollen-grain, I cannot pronounce; I can only certify to the occurrence of both forms in plants from the same station, and that the globose form is much the rarer of the two.

In its fresh state the pollen-grain is of a pale yellow colour, and its contents are granular. It must be produced in great abundance, as I have frequently found it in a free state in the water of the glass jars which have held the living plant during these investigations; grains also occur floating about in the chloride of sodium solution, which I use for mounting the dissections of the plant for permanent microscopic examination.

XIII.—FERTILIZATION.

The pollination of *Naias graminea* is entirely effected in the water, as there is no provision for an elongation of the peduncle to raise the pistilliferous flowers up to the surface of the water, as in *Potamogeton Zizii*, *Valisneria*, *Anacharis*, and other aquatic plants. The structure of the inflorescence forbids its being considered a cleistogamous flower; whether it is an aquatic type of an anemophilous or an entomophilous plant I cannot determine.

Some observations I have noted for recording here are of some interest, as they suggest that pollination is effected in two ways. In the station in which the *Naias* occurs near Manchester the very slight natural flow of the water in the canal towards the locks is quite sufficient for the transport of the pollen, and, though I have not purposely taken some of the canal water to see if it contained

free pollen, my home observations leave me no doubt that pollen is carried to the pistilliferous flowers by the current; in such case the plant would be hydrophilous. While, however, examining portions of a living plant on which were ripe anthers, I noticed a colony of *Vorticellidæ* attached to one of the fascicles of leaves; the grace and activity of its movements led me to watch it for a considerable time, and whilst so watching it I witnessed grains of pollen whirled in all directions, or drawn into the vortex of the animal by its marginal cilia. The alternate contraction and elongation of the elastic and thread-like pedicles of the colony kept the pollen-grains in constant motion, which left me no doubt that at times the grains would be directly borne to the stigmatoid appendages of the pistilliferous flowers.

The canal-water is most prolific in animal life; beetles, molluscs, leeches, rotifers, polyps, larvæ of insects, &c., must surely prove potent factors in transporting pollen not only in the tepid water of the Reddish canal, but in the still water of pools and ditches. If we carefully look for instances of their intervention we cannot fail to find distinctive protozophilous plants, dependent for their fertilisation upon animal life in the aqueous world, in much the same way as we find entomophilous plants in the aërial world.

It is a very happy circumstance that Sir Joseph Hooker should have indicated the forms of pollination which prevail in many of our native plants, where known. Sprengel, Darwin, Müller, Lubbock, Kerner, and many others have largely increased our knowledge of this subject for terrestrial plants, but its extent after all is very limited; we have but ascended a few steps leading up to the vestibule, whilst the great temple of truth is beyond. While, as regards aquatic plants, and particularly those which are wholly submersed throughout their lives, like *Naias graminea*, *Stratiotes*, &c., our knowledge is even more and more limited. Hence Sir Joseph Hooker has earned the thanks of British botanists by bringing into prominence, in his 'Student's Flora,' this important feature in the economy of our native plants.

Fig. 81.

Fig. 83.

Fig. 82.

XIV.—The Fruit.

Up to the time of the fertilization of the ovule the outer membrane of the flower—the perianth, and the investing membrane of the ovule contained within the perianth, both remain transparent or semi-transparent. After pollination has taken place the membrane of the ovule becomes turbid and thickens, while the ovule itself enlarges and becomes a mature fruit, covered with a testa formed of thick-walled cells (figs. 81 to 88).

The fruit is sculptured with a network of raised ridges which thus produce depressions in the shell; this sculpture seems to have its seat in one of the inner membranes of the shell, since it cannot always be distinguished through the most external layer. As far as I have been able to make it out, it is somewhat after the character of the accompanying fig. 84; but this must be looked upon as a diagramatic interpretation of what is supposed to be seen, rather than an actual representation of fact. In the same way I have drawn the testa of *Naias flexilis* in fig. 85 from a single mature fruit in one of Dr. Boswell's Loch Cluny specimens; I am more sure of the correctness of this figure than of that of *N. graminea*, but it represents what is seen in a single fruit only. It would therefore appear that the sculpture of *N. flexilis* is quadrangular, while that of *N. graminea* is hexagonal; but too much must not be made of observations founded on such a limited basis.

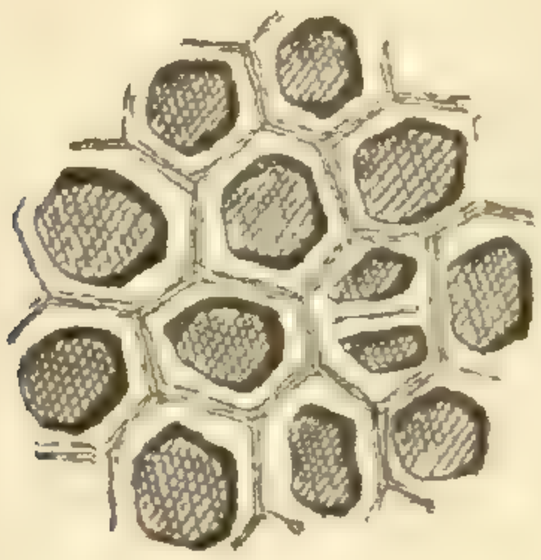

FIG. 84.

FIG. 85.

According to the observations of Cesati* the fruits of the Italian *N. alagamensis* are granulose-punctate, which fairly well describes the appearance of the outer covering of the Manchester ant; but Cesati's figure in 'Linnæa,' *l. c.*, Table ii., fig. 2 *d*, makes the fruit much more papillate than I find it in the Lancashire form. On the other hand, this same observer makes the fruit of *N. flexilis* shining and obscurely angular, and he so draws it in his plate.

The explanation of this difference in the form of sculpturing is probably due to the fact that the external membrane more or less obscures the underlying layer, and thus the latter is seen by observers according as the transparency of the outer layer admits of it. For the further elucidation of this point I have reproduced the figures of Dr. Magnus in Plate 252, where figs. 40 and 41 show the arrangment of the coats of the fruit of *N. graminea* from Cairo, and figs. 37 to 39 those of *N. flexilis*.

At Reddish mature fruits of *N. graminea* are produced in great abundance; scarcely a plant occurred without fruits. In the many hundred plants which I have examined I have not seen a single instance where the beak of the fruit was other than bifid, unless it had broken off altogether, as represented in figs. 81 and 83,

* "Die Pflanzwelt im Gebiete zwischen dem Tessin, dem Po, der Sesia und den Alpen," ('Linnæa,' vol. xxxii., 1863, pages 259 and 260).

and in the middle fruit of figure 86. This division of the beak into two branches is a constant character, and very clearly distinguishes it from the four-rayed beak of *Naias flexilis* (fig. 87).

Fig. 86.

Fig. 87.

One other point of differentiation between *Naias graminea* and *N. flexilis* rests in the shape of the fruit. In the former the ends are more abruptly narrowed into the base and the beak than they are in the latter, which has gradually narrowing ends; compare figs. 86 and 87. Cesati's figures in 'Linnæa' xxxii., Plate 2, confirm this conclusion.

The perianth easily separates from the fruit; it is represented in fig. 88. The portion which covers the body of the fruit consists of a single layer of cells.

Fig. 88.

XV.—The Roots.

The roots are of great length, creeping in the soft black mud of the bed of the canal; they are given off from the nodes in verticils. They are capillary, uniform in diameter, even when nine inches long, tawny-orange in colour, and I have not seem them branch.

In internal structure they bear some resemblance to the stems. There is a central channel surrounded by a mass of elongate cells hexagonal in outline, smaller in size, and with thinner walls than those of the rest of the cells within the cylinder. Outside this area is a row of cells whose walls are darker coloured than any of the others (except the cells which form the exterior of the cylinder), and they so arrange themselves as to form a sheath round the central cells; from this row of cells numerous short branches are given off which enclose intra-cellular cavities, similar to those

in the stem, but much smaller and more circular (see fig. 89). These cavities are regularly arranged in one series round the central mass, as in the stem, but there are occasionally outlying cavities in the neighbourhood of the external orange-coloured cells, as shown in fig. 89. Enclosing the whole is a layer of larger-sized cells, of a dark brown colour, and more angular in outline than any of the other cells. In the midst of these cells, but on the outermost side, are a few cells filled with a rich tawny brown pigment. The walls of the circumferential cells are all very thin, and they have the rich colour of the pigment cells.

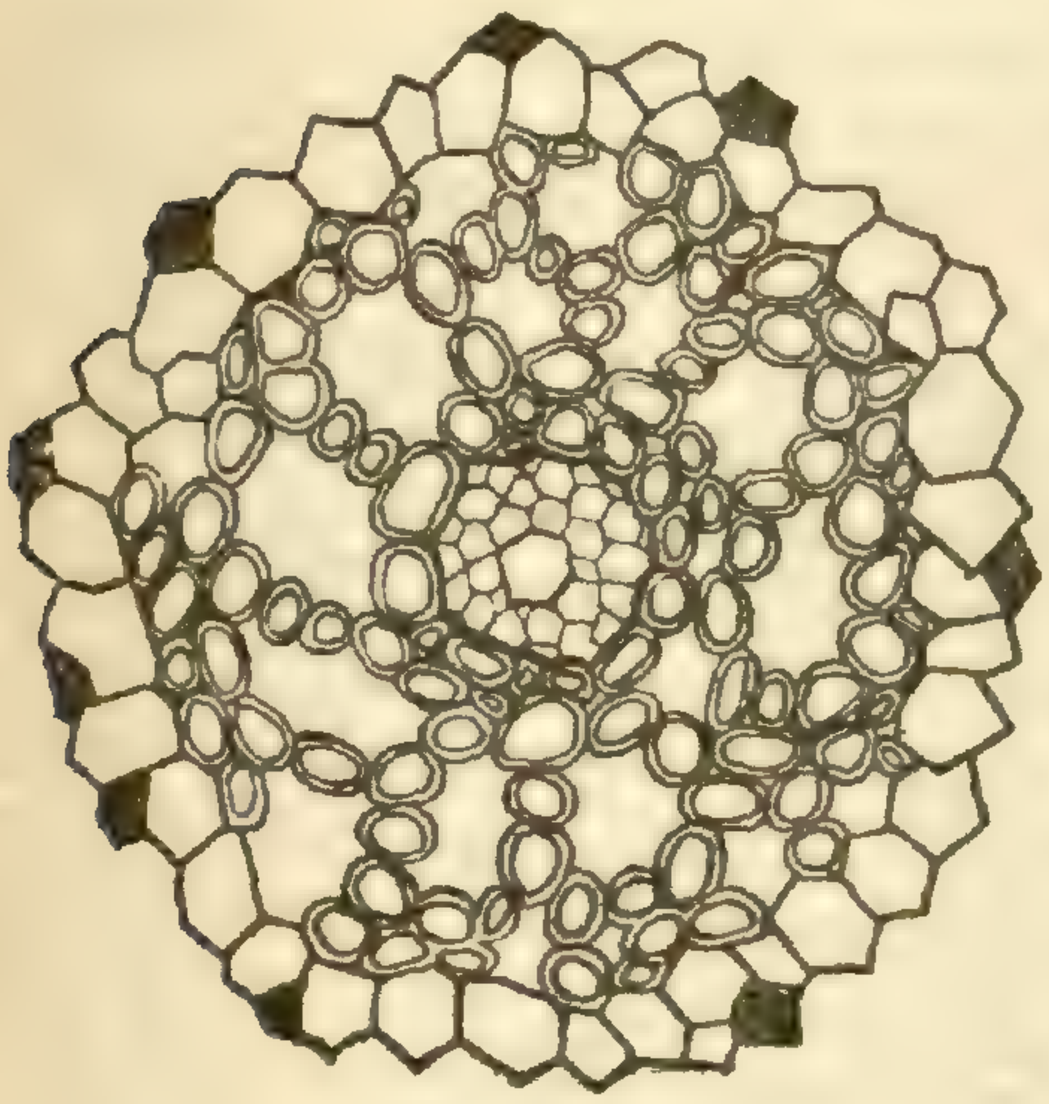

FIG. 89.

In addition to the roots proper the plant gives off adventitious roots from the stem-nodes, as represented in Plate 249. These are generally given off singly from between the first pair of leaves of the fascicle; occasionally two proceed from the same node, but in such case the second root emerges on the opposite side of the node. In the lower portions of the stem the adventitious roots become more numerous from each node, and they begin to acquire the orange colour of the roots proper. They attain a length of from half an inch to six inches or more, and they have a similar internal structure to that of the roots proper; the peripheral cells, however, do not possess the angular character nor the tawny colour of the outer layer in the lower roots. The tissue is more loosely aggregated; the intra-cellular cavities are fewer in number and smaller, scarcely exceeding the size of the cells which surround them. The central cavity is present, as well as the surrounding sheath, but the cells of the latter are fewer than they are in the root proper. The external cells do not differ much from the inner cells either in shape or in colour, the rich pigment of the corresponding layer in the root being absent.

XVI.—The Lancashire Locality.

The occurrence of a *Naias* in Lancashire was so unexpected a circumstance that I was pleased, through Mr. Whitehead's kindness, to have the opportunity of seeing the plant in its station in the canal at Reddish, near Manchester. The precise locality was not intended to be published, but as the station seems to be well known to so many local botanists there is no further need to suppress it.

When I first visited the canal, on the 14th September, 1883, the *Naias* grew in an area of about a quarter of a mile in length; in some portions of this space it was the prevailing plant, wholly covering the canal-bed, while in other portions it was intermixed with *Potamogeton rufescens*, *P. obtusifolius*, *P. crispus*, *P. pusillus*,

Myriophyllum, and *Anacharis*. Except in so far that the station, like most canals, was an artificial one artificially supported, there seemed nothing in the accompanying vegetation to suggest that the *Naias* was not aboriginal. All the other plants were of the prevailing canal character, the non-native *Anacharis* being as much at home as any of them.

The temperature of the canal water is, however, artificially raised by the discharge of hot water from boilers and condensing tanks attached to the cotton-mills and other works, which are erected on the banks of the canal. In the declining evening of my first visit the water was quite warm, say about 90° Fahr. This abnormal temperature must be looked upon as the important factor in the struggle for existence maintained by this plant. In subsequent visits to the canal the temperature of the water was not met with so high as it was found on the first occasion; still, with the fitful discharge of hot water into the canal at many points, its average temperature must be many degrees above the normal point for the neighbourhood. It might have been expected that the vegetation which grows in this tepid body of water would have shown signs of luxuriance, but such does not appear to be the case. The most striking variation is met with in *Potamogeton crispus*, which becomes dwarfed, particularly in stations where there is an inflowing stream of warm water.

Two other plants which grow in the same canal ought to be noticed in this connexion. The first of these is the *Chara Braunii* Gmel., which the Messrs. Groves figured and described in the 'Journal of Botany' for January, 1884, t. 242, p. 3. This plant affects the edges of the canal, but it also occurs in the deeper water of the centre, where it is more liable to be cut down by the passing barges. Another interesting plant grows with the *Chara*, whose identity is by no means settled, and it may prove worthy of a more detailed notice *viz.*, a species of *Zannichellia*.

Mr. Whitehead had mentioned to me, on the occasion of our joint visit, that *Z. palustris* had been recently found in the canal, and as it was an infrequent plant in the district surrounding Manchester, I was anxious to procure specimens, although it involved a moonlight search. It was while hunting for this plant that, unknown to myself or to my companions, I collected the *Chara* in the darkness; the specimens were very fragmentary, but from them Mr. Arthur Bennett determined the plant to be the *Chara Braunii*, new to the British Flora. In justice to Mr. Whitehead it ought to be stated that he and Mr. Armitage had collected it in the same station a fortnight or so prior to my visit.

The *Zannichellia* grows in the soft mud in the shallower parts of the canal, with *Chara Braunii* and *Potamogeton pusillus*; it also occurs in places where the water scarcely covers it. It would appear to flower and fruit in the mud as well as in the water, but the fruits which are produced in mud are of a very pale yellow-green, on account of their imperfect exposure to the light. From the dwarf, creeping, habit of the plant it seems to have an affinity with the form of *Z. palustris*, named *Z. repens* Bœnningh. The

characters of the Reddish plant agree with the description of *Z. repens* in essential points, but the stigma is not usually more enlarged than in *Z. palustris*, whereas this feature is a decided character, both in the diagnosis and in Reichenbach's plate.* In the spring and early summer it has large reserve-buds, of the size of peas, from which the shoots take their rise.

One of its peculiarities is, that it has four or five rows of spines or protuberances on the dorsal and ventral edges of many of its carpels, and much more prominent than they are in *Z. pedunculata*, *Z. gibberosa*, and *Z. polycarpa*.

Delile reports † finding *Zannichellia palustris* in a lake near to Fâreskour in Lower Egypt, along with *Naias muricata*. It would be interesting to determine whether the form is the same as that which occurs in the canal at Reddish. Local botanists also ought to keep an eye upon the possible occurrence of the rare *Naias muricata*, figured and described by Delile; so far it has only been recorded for Egypt and Arabia.

The locality which produces such an extra-anglican species as *Naias graminea* must be worth exploring for the animal life which is fostered by the same high temperature which has sustained the *Chara* and the *Naias*.

XVII.—Geographical Distribution.

Naias graminea is distributed over a wide area. It occurs in a natural state in the northern and central parts of Africa, in Syria (Plain of Sharon: 'Memoirs of the Palestine Exploration Fund,' Fauna and Flora, p. 416), and Persia, in the Indian Archipelago and other warm regions of Asia, and probably in Japan. It does not occur in Europe except as a colonist, it having been introduced (according to the Italian botanists) with East Indian rice, into districts where that cereal is cultivated, as in the plains of Lombardy and Venice; the Italian localities are given in Cesati's 'Compendio della Flora Italiana,' as Alagna in Novara, Balzola between Vercelli and Casale, Merlato near Milan, Upper Vercellese, Strasoldo nel Friuli near Palmanavo. It has also been reported from the extreme north-eastern portion of Austria; but it is not native in any of its European stations, and it is an introduction in Lancashire. It becomes, therefore, an interesting question to account for its appearance in a country which does not grow the rice which it consumes.

XVIII.—Its probable Source of Origin.

When this plant was exhibited at the British Association at Southport, in September last year, I expressed the opinion in the Biological Section, that it had probably been introduced into the Reddish locality with Egyptian cotton. This class of cotton is not one of the staple articles of consumption in the Stockport district,

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* Icones Floræ Germanicæ, &c., vol. vii., fig. 20, pl. xvi.

† 'Flore de l'Egypte,' vol. ii., p. 281; and also on page 75 under No. 872.

but there is one mill on the banks of the canal (Houldsworth's) which consumes Egyptian cotton largely, and from it, if not from others, the fruits of the *Naias* may have been transported to the canal. Last autumn, Mr. J. Cosmo Melvill and myself carefully examined the large condensing tank in the yard of this mill, but we could not find a trace of the plant; the water was of a high temperature and little vegetation was found in it, but its depth was beyond our means of properly exploring it.

Alire Raffenau Delile* gives an account of the culture of rice in Egypt, and shows that the water used for the young plants is drawn fron the Nile by fixed machines during the principal part of the year; but in times of inundation, during the rising of the river, the water is naturally distributed, its particular course being regulated by the embankments which protect the fields. He states that the plant grows in the canals of the rice-fields at Rosetta and in the Delta, but he considered it only a variety of *Naias fragilis*, which grows in the same waters.

The irrigation of modern Egyptian cotton plantations will be effected by much the same means, the Nile, with its artificial ramifications, being the chief water supply of the country. Fruits of the *Naias* may reach Egypt from Abyssinia, or from the great lakes of Equatorial Africa; the Nile water supplied to the growing cotton-plant will be accompanied by these fruits, some of which would be left dry upon the surface after the water had percolated through the upper soil, but they would not germinate there. Either by the agency of the wind, or through accidental contact with the soil, they become mixed with the cotton exported to England. When the bales of cotton reach the Lancashire mills, the fruits of the *Naias* would be removed in the blowing-room, or by the carding-engines. The refuse is turned out of the mill into the yard, whence the wind and other agencies transport the fruits into the tepid water of the canal; here they meet with a suitable nidus for germination and growth, and the result is the appearance of an alien in our flora.

If these surmises have any substratum of truth, the *Naias* may occur in any mill-pond connected with works where Egyptian cotton is used, and where the water is raised to a permanently high temperature by the condensation of steam from the boiler. As Egyptian cotton is largely used in Bolton, the mill-ponds and canals of that neighbourhood may be expected to contain *Naias graminea* and other Egyptain aquatic plants, as *Naias muricata* Del., *Chara Braunii* Gmel., &c.

The Egyptian origin of the plant is to some extent confirmed by the form of *Chara Braunii* which grows at Reddish being very near the form of that species which occurs in Northern Africa. Whether there is anything showing an affinity to the Egyptian plant in the peculiar form of *Zannichellia* which grows in the same canal, I have not the means of determining; but both it and the

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* 'Mémoire sur les plantes qui croissent spontanément en Egypte,' vol. ii., pp. 16, 17.

Chara Braunii are so often associated together as to give a strong colour to the surmise of their common origin. There is nothing in the recorded distribution of *Chara Braunii* to forbid its being ultimately shown to be aboriginal, but until it is recorded from other British stations, with fewer doubtful surroundings than it has in the Manchester station, it can only be looked upon as a colonist.

XIX.—A Histological Peculiarity.

A still stronger proof of its Egyptian extraction is furnished from the histological side. This part of the case has been dealt with by Dr. Magnus, in a paper read to the German Botanical Association at Berlin, December 11th, 1883, and I make no apology for reproducing here the substance of this interesting communication. In describing the structure of *Naias graminea* on page 13, I mentioned that there were two forms of the plant; one, possessing peculiar libriform cells near the margin of the leaf; the other, destitute of these bast-cells. This latter form Dr. Magnus names the var. *Delilei*, and he states that the English specimens belong to this variety, and indubitabty prove their Egyptian source. The following are some extracts from the paper of Dr. Magnus, published in the 'Berichte der deutsch. Botanischen Gesellschaft,' Jahrg. 1883, Band i., Heft 10 :—

"I have examined the specimens of *Najas graminea* collected by Delile in the rice-fields near Rosetta, as also those obtained by Schweinfurth near Benha-el-assl in the Nile Delta, and have found them to be without bast-nerves. They are also wanting in a specimen collected by Gaillardet, near Saida in Syria, which has been kindly communicated to me by M. Boissier. I was further enabled, through the kind communication of Professor Ascherson, to examine specimens of *Najas graminea* Del., collected by him during his travels in the Libyan Desert, in the Oasis of Dachl, as also specimens collected by Schweinfurth in the Great Oasis (Chargeh). From this it would appear that the *Najas graminea* Del., collected in a brook at Aïn-Scherif near Kasr Dachl, as well as those collected by Ascherson near El Chargeh, likewise have leaves without libriform cells, like the plants of Lower Egypt. On the other hand, the *N. graminea* collected some weeks later in the same ditches in Aïn-Scherif by Ascherson, as well as from a warm spring-hole in Kasr Dachl, as also the specimens collected by Schweinfurth near Chargeh, have all well-developed bast-nerves, similar to the plants of Cordofan, Djur, Algeria, Celebes, &c. . . .

"The absence of these bast-nerves in a variety of *Najas graminea* is the more peculiar, as through the construction of the male flower of *N. tenuifolia* R. Br. [see fig. 15, Plate 251], from Australia, which differs so materially, has precisely the same bast-nerves in exactly the same shaped libriform cells on the leaves; consequently these bast-nerves represent the distinctive character of a group of allied species, but still subject to variations. . . . .

"I have mentioned above that the one set of specimens from Kasr-Dachl and Chargeh had leaves without bast-nerves, and

that another set had them; that is, that the one set belong to the var. *Delilei*, while the other agrees with the form which appears in Cordofan, Djur, Algiers, &c. This would appear to be a clear proof that the oases of the Libyan Desert have received their flora from Egypt as well as from Central Africa. This agrees with the results of the investigations which Ascherson furnished to the 'Botanische Zeitung' for 1874, pages 641 to 644.

"These explanations would, however, seem to be somewhat contradictory, seeing that the English specimens are remarkable for their great length of leaf, whereas the leaves of *N. graminea* from Cairo and Damietta are very short. But a minute examination of form teaches us that we must not attach much importance to the question of the length of leaves, which is influenced, as in most water-plants, by the depth, current, bed, and temperature of the water. Thus we find that the specimens collected by Professor Ascherson in the Dachl Oasis, from the deeper pools (half a metre deep), have long leaves as well as bast-nerves, and yet the English specimens have longer leaves without bast-nerves; while the Egyptian specimens have shorter leaves without bast-nerves. Thus, again, we find the *N. graminea* Del., growing in the shallow ditches of the rice-fields of the plains of Lombardy, has short leaves with bast-nerves, whereas the *Najas graminea* from Celebes has very long leaves with bast-nerves. In short, we see that the length or shortness of the leaves has nothing whatever to do with the formation of the variety, and nothing to do with the histological formation of the leaf-tissue.

"It is nevertheless possible that the var. *Delilei*, deprived of the bast-nerves, has been developed in the quiet stagnant waters of the overflowed Nile, as in these stagnant waters the mechanical cells would become deprived of their functions. Thus we find Schwendener, in his exhaustive work, 'The Mechanical Principle in the Anatomical Coustruction of Monocotyledons,' Leipzig, 1874, page 122, remarking that *Potamogeton fluitans* in its customary habitat of running water has a developed system of bark-bundles, whereas the var. *β stagnalis* Koch is completely deprived of same.

"The var. *Delilei*, found in the stagnant waters of the overflowed Nile, is a most persistent and constant one, as during a period of a hundred years it has been indubitably collected by Delile, Schweinfurth, and Ehrenberg, in Lower Egypt. Its unaltered appearance in England and in the oases shows its constancy and total independence of habitats, whilst its formation has probably been caused by the same."

It now only remains to me to tender my acknowledgments to Mr. Ridley, Mr. Arthur Bennett, Dr. Magnus, Professor Ascherson, Mr. Beeby, and to the Editor of this Journal, for help rendered. The delay which has occurred in completing this paper has been unavoidable; it has had to take its turn in the intervals of a busy life.

XX.—Explanation of the Figures

Plate 249.

Fig. 1. The upper portion of a branch of *N. graminea*, from Reddish; nat. size.

2. Two of the leaves from same, drawn rather broader than the natural size, the sheaths and auricles flattened out.

Plate 250.

3. Upper portion of a branch of *N. graminea* from Lower Egypt. Copied from Delile's drawing in his 'Flore de l'Egypte,' but reduced to two-thirds original size.

4. Base of a leaf-fascicle, showing leaf-auricles, fruits, &c.; slightly enlarged. From Delile's 'Flore de l'Egypte.'

5. Section of fruit; enlarged. From Delile's 'Flore de l'Egypte.'

Plate 251.

6—8. Arrangement of the cells of the marginal spines on the leaf of (6), *N. flexilis;* (7), *N. graminea;* (8), *N. minor* and *N. arguta*. From Dr. Alexander Braun's sketches in 'Journal of Botany,' 1864, vol ii., p. 275.

9. Form of sheath at base of leaf of *N. minor;* from 'Compendio della Flora Italiana,' of Cesati, Passerini, and Gibelli, tav. xxviii, fig. 1 *n*.

10—14. Form of sheath at base of leaf of (10), *N. flexilis;* (11), *N. minor;* (12), *N. minor*, var. *setacea;* (13), *N. falciculata:* and (14), *N. graminea*. All copied from Dr. A. Braun's woodcuts in 'Journal of Botany,' 1864, vol. ii., p. 274.

15. Male flower of *N. tenuifolia* R. Br. Enlarged $\frac{1}{1}^{6}$. From Magnus's 'Beitrage,' plate iv., fig. 5.

16. Anther of *N. major*, with the perianth reflexed; enlarged. From 'Genera Plantarum Floræ Germanicæ,' Th. Fr. Lud. Nees ab Esenbeck, Fasc. vi., *Naias*, fig. 5.

17. Male flower of *N. minor;* enlarged. Nees ab Esenbeck, *l. c.*, fig. 24.

18. Transverse section of male flower of *N. major*. Nees ab Esenbeck, *l.c.*, fig. 7.

19. Pollen of *N. major;* enlarged. Nees ab Esenbeck, *l. c.*, fig. 8.

20. Male flower of *N. major*, with the perianth drawn back; enlarged. From 'Iconographia familiarum naturalium regni vegetabilis,' Dr. Adalbert Schnizlein, Heft v., pl. 71, fig. 4.

21. Vertical section of male flower of *N. major:* enlarged. Schnizlein, *l. c.*, fig. 6.

22. Male flower of *N. major*, showing the separation of the perianth from the anther; enlarged. Schnizlein, *l. c.* fig. 7.

23. Vertical section of a male flower of *N. major*. From 'Compendio della Flora Italiana,' *l. c.*, fig. 1 *b*.

24—25. Dehiscence of the perianth of *N. major*, after the observations of Braun; enlarged. Nees ab Esenbeck, *l. c.*, figs. 9 and 10.

26. Grains of pollen of *N. major*, with fovilla; enlarged $\frac{2}{1}^{0}$. From 'Compend. Fl. It.,' *l.* c., fig. 1 *d*.

27. Vertical section of a male flower of *N. minor* All.; enlarged. 'Compend. Fl. It.,' *l. c.*, fig. 1 *e*.

28. Male flower of *N. major;* enlarged $\frac{1}{1}$. 'Compend. Fl. It.,' *l, c.*, fig. 1*a*.

29. Base of leaf of *N. major* with the sheath opened. Intravaginal scales at the base of the sheath, one on each side; enlarged $\frac{2}{1}$. 'Compend. Fl. It.,' *l.* c. fig. 1 *m*.

30. Intravaginal scale of *N. major;* enlarged $\frac{2}{1}$. 'Compend. Fl. It.,' *l. c.*, fig. 1 *o*.

Plate 252.

31. Transverse section of the middle of the leaf of *N. graminea*, Del.; enlarged $1\frac{5}{1}^{2}$. Magnus, 'Beitrage,' pl. vi., fig. 3.

32. Transverse section of the side of the leaf of *N. graminea*, Del., from Celebes; enlarged $3\frac{3}{1}^{5}$. Magnus, 'Beitrage,' pl. vi., fig. 2.

Fig. 33. Transverse section of the leaf of *N. graminea* Del., from Celebes; enlarged $\frac{130}{1}$. Magnus, 'Beitrage,' pl. vi., fig. 1.

In Figs. 31—33 the leading bundles are drawn schematically: *i* = intercellular spaces, *b* = bast-cells.

34. Isolated bast-cell from the leaf of *N. graminea* from Celebes; enlarged $\frac{152}{1}$. Magnus, 'Beitrage,' pl. vi., fig. 4 *b*.

35. Male flower of *N. graminea*; enlarged $\frac{36}{1}$. Magnus, 'Beitrage,' pl. iii., fig. 6.

36. Transverse section of the stem of *Caulinia alaganensis*. From 'Tavole per una Anatomia delle piante aquatiche,' Parlatore, pl. vi., fig. 3.

37. Surface-view of the outer cell-layer of the unripe seed of *N. flexilis;* $\frac{103}{1}$. Magnus, 'Beitrage,' pl. v., fig. 9.

38. Diagonal section of the nearly ripe seed-shell of *N. flexilis:* enlarged $\frac{198}{1}$. Magnus, 'Beitrage,' pl. v., fig. 8.

39—40. Diagonal sections of the still (? if not always) unripe seed-shell of *N. graminea* from Cairo; enlarged $\frac{98}{1}$.

41. Diagonal section of the quite ripe seed-shell of *N. graminea* from Cairo; enlarged $\frac{198}{1}$. Magnus, 'Beitrage,' pl. v., fig. 12.

Figures in the Letterpress.

All the figures are drawn from Reddish specimens of *Naias graminea* Del., var. *Delilei* Magnus, except when stated otherwise.

42. *N. graminea.*—Transverse section of stem, drawn diagrammatically; enlarged $\frac{52}{1}$.

43 and 44. *N. graminea.*—Ends of leaves, showing dentition; enlarged $\frac{14}{1}$.

45 and 46. *N. flexilis.*—Spines on margins of leaves, from specimens collected by Dr. Boswell, in Loch Cluny, near Blairgowrie, Perthshire; enlarged $\frac{156}{1}$. See 'Journal of Botany,' No. 154, 1875, p. 297.

47 to 49. *N. graminea.*—Spines on margin of middle portion of leaf; enlarged $\frac{156}{1}$.

50. *N. minor.*—Tooth of leaf from one of Archbishop Haynald's specimens from ponds in his park at Kalocsa, Hungary; enlarged $\frac{156}{1}$.

51. *N. major.*—Tooth of leaf from plant collected near Coblentz, by Dr. Ph. Wirtgen; enlarged $\frac{156}{1}$.

52. *N. graminea.*—Large leaf-sheaf from leaf of first pair; enlarged $\frac{14}{1}$.

53. *N. graminea.*—Usual form of leaf-sheaf from leaf of first pair; enlarged $\frac{14}{1}$.

54. *N. graminea.*—Usual form of leaf-sheaf from leaf of first pair, with irregular-sized auricles; enlarged $\frac{14}{1}$.

55. *N. graminea.*—Leaf-sheaf from leaf of second pair; enlarged $\frac{14}{1}$.

56 and 57. *N. flexilis.*—Leaf-sheath from Scotch specimens; enlarged $\frac{14}{1}$.

58. *N. graminea*—Spines on margin of auricles; enlarged $\frac{156}{1}$.

59. *N. flexilis.*—Spines on margin of auricles from Loch Cluny. They are the first four which occur on the left shoulder of Fig. 57, above the minute spine, nearest the base of the sheath; enlarged $\frac{156}{1}$.

60 to 65. *N. graminea.*—Transverse sections of leaves, beginning near the summit; enlarged $\frac{32}{1}$.

66. *N. alaganensis.*—Libriform cells in margin of leaf, from Malinverni's Italian specimens; enlarged $\frac{156}{1}$. The libriform cells are the long cells without cell-contents.

67. *N. graminea.*—Young antheriferous and pistilliferous flowers growing side by side; enlarged $\frac{18}{1}$.

68. *N. graminea.*—Older antheriferous and pistilliferous flowers growing side by side; enlarged $\frac{18}{1}$.

69. *N. graminea.*—Portion of central infloresence; enlarged $\frac{36}{1}$.

70. *N. graminea.*—Pistilliferous flower with contiguous bracts; enlarged $\frac{18}{1}$.

71. *N. graminea.*—Young pistilliferous flower; enlarged $\frac{18}{1}$.

72 and 73. *N. graminea.*—Young pistilliferous flowers, showing the stigmatoid appendages; enlarged $\frac{18}{1}$.

74 and 75.—*N. graminea.*—Young antheriferous flowers; enlarged $\frac{23}{1}$.

76. *N. graminea.*—Young antheriferous flower, showing immature pollen; enlarged; $\frac{28}{1}$.

Fig. 77. *N. graminea.*—Antheriferous flower not fully ripe; enlarged $\frac{2}{1}^3$.
78. *N. graminea.*—Mature antheriferous flower; enlarged $\frac{2}{1}^9$.
79. *N. graminea.*—Globose pollen; enlarged $\frac{1}{1}^6$.
80. *N. graminea.*—Elliptico-cylindrical pollen; enlarged $\frac{1}{1}^6$.
81. *N. graminea.*—Fruit, with immature pistilliferous flower in the same bract; enlarged $\frac{1}{1}^8$.
82 and 83. *N. graminea*—Fruits nearly mature; enlarged $\frac{1}{1}^8$.
84. *N. graminea.*—Supposed ridges and pits, of hexagonal outline, on surface of fruit; as seen with a $\frac{4}{10}$ objective, Lieberkuhn and Kelner B eye-piece.
85. *N. flexilis.*—Ridges and pits, of quadrangular outline, on surface of fruit; as seen with a $\frac{4}{10}$ objective, Lieberkuhn, and a Kelner B eye-piece.
86. *N. graminea.*—Three mature fruits and an immature pistilliferous flower in the same verticil; enlarged $\frac{1}{1}^4$.
87. *N. flexilis.*—Mature fruit from Loch Cluny specimen; enlarged $\frac{1}{1}^4$.
88. *N. graminea.*—Perianth removed from fruit; enlarged $\frac{1}{1}^4$.
89. *N. graminea.*—Transverse section of the root; enlarged $\frac{6}{1}^5$.

A NEW BORNEAN ORCHID.

By H. N. Ridley, M.A., F.L.S.

Liparis grandiflora, sp. n. — Pseudobulbosa folio singulo coriaceo ovato lanceolato magno, scapo erecto pedali, tereto validulo, floribus magnis, paucis, pedicellis longis, bracteis membranaceis lanceoalatis acutis, sepalis ligulatis-lanceolatis obtusis, petalis subæquantibus multo angustioribus, labello cuneato bilobo crenulato, marginibus pubescentibus, olumna gracili curva, basi parum dilatata, supra alata, anthera depressa, obtusa, biloculari.

Borneo, mountains of Mindai-Pramassan. July 19, 1882. Grabowsky, in Herb. Brit. Mus.!

This is the largest-flowered Liparis known to me. It has a single, broad, stiff leaf, strongly ribbed on both sides, eight inches in length by two and a-half in breadth; a stout scape one foot long, bearing sometimes as many as fifteen large flowers, on pedicels nearly one inch long. The bracts are dry and persistent. The petals and sepals are ligulate, half an inch long, the former much narrower than the latter, and, according to a drawing made of the same plant by Mr. H. Everett, in Sarawak, light greenish. The lip is large, $\frac{3}{4}$ inch long by $\frac{1}{2}$ inch in its broadest part; cuneate and emarginate, the edge crenulated and minutely pubescent; brownish ochreous, with a darker line down the centre. The column is slender, slightly curved, with two small wings flanking the stigma, $\frac{1}{4}$ inch long. The anther is small, rather flat, notched in front, dark green. The specimen drawn by Mr. Everett was rather smaller than that of Grabowsky, the whole plant being not much more than seven inches high, with only four flowers.

NOTES ON THE FLORA OF MATLOCK.

By J. G. Baker, F.R.S., and the Rev. W. W. Newbould, M.A., F.L,S.

The present paper contains a series of notes on the flora of Matlock, brought together for the purpose of comparison with the similar set of notes on the flora of Buxton, printed in this Journal for January last, and the supplementary records by Mr. W. West and the Rev. W. Moyle Rogers. The botany of Derbyshire is of great general interest, because the position and physical configuration of the county are such that it shows better than any other the blending of the flora of the North of England into that of the Midland Counties. It is the county that shows best the widest range we get in any one county of Watson's agrarian region. Perhaps no other county is better divided out, apart from climate, into well-marked physical divisions. In Derbyshire there are, as Mr. Painter has already explained, three of these:—1st, the low country apart from the hills; 2nd, the limestone hills and valleys; 3rd, the ridges and slopes of millstone grit.

All the country included in the present list falls within the compass of Watson's mid-agrarian zone, and it just covers its full extent. Whilst the river at Buxton is 950 ft. above sea-level, at Matlock it has fallen to 350 ft. The highest point near Matlock, the heights of Abraham, is a limestone ridge, a little under 1100 ft. above sea-level; so that, whilst half the area round Buxton falls within the superagrarian zone, and we reach up on Axe Edge to the lower limits of *Rubus Chamæmorus*, round Matlock we never get out of mid-agrarian limits. There is probably no hilly tract in Britain where the limestone so completely predominates over every other kind of rock, and, as a consequence, in which the damp-loving plants are so poorly represented. We have not succeeded in finding any *Myrica*, *Menyanthes*, *Narthecium*, *Montia*, or *Drosera* whatever, and a number of the common moorland plants of the North Country, such as *Viola palustris*, *Digitalis*, *Molinia*, *Hydrocotyle*, *Triodia*, *Juncus squarrosus*, and such like, are seen only when the gritstone crops out to form the hill ridges; whilst the paucity of *Juncus*, *Luzula*, *Scirpi*, and *Carices* is in striking contrast to what may be seen in the ordinary hilly regions of Wales and the North of England.

The list is the result of a fortnight's search, at the end of August and the beginning of September, so that no doubt many species which are really present have been overlooked from the lateness of the season. We spent a single day at Dovedale, and made also a catalogue there, confining ourselves to the Derbyshire side of the stream. The cliffs there are just like those of Matlock, but the general character of the flora is a shade less montane. The species noted there are distinguished by a D after the name.

Thalictrum. None seen. The Castleton plant reported as *flexuosum* will likely prove to be really a *montanum* form.

Ranunculus aquatilis. Rare about Matlock. Abundance of var. *penicillatus* in the stream in Dovedale. — *R. Flammula*, *acris*, and

repens. All three about Matlock and in Dovedale, the two latter up to 350 yds.—*R. bulbosus* and *Ficaria*.

Caltha palustris. Matlock and Dovedale; rare.

Aquilegia vulgaris. Limestone bank at Matlock Bath; perhaps not indigenous.

Papaver Rhœas. Only seen once, at Whatstandwell.—*P. dubium*. Scattered in cultivated fields, var. *Lecoqii* seen as well as the type, up to 250 yds.

Chelidonium majus. Roadsides at Cromford and Matlock Bath.

Corydalis lutea. Occasionally on walls, as about Matlock Bridge Station.

Fumaria officinalis. A weed of cultivated ground up to 250 yds. No *capreolata* seen.

Raphanus Raphanistrum. A rare weed; only the form with bright yellow flowers like those of a *Sinapis* seen.

Sinapis arvensis. A frequent weed up to 250 yds.—*S. alba*. An occasional straggler from gardens. — *S. nigra*. Derwent bank at Matlock Bridge.

Brassica Rapa. A common weed of cultivated ground up to 300 yds. Forms with both lemon-yellow and orange-yellow flowers.

Sisymbrium officinale. Roadsides up to 300 yds.; common.—*S. Alliaria*. D. Very fine in the limestone woods.

Cardamine pratensis. Damp fields up to 350 yds.—*C. hirsuta* and *sylvatica*. Both frequent.—*C. impatiens*. Via Gellia, Cromford Dale, and other limestone woods; plentiful.

Arabis Thaliana. Gritstone walls at Matlock Bridge.—*A. hirsuta*. D. Limestone walls and cliffs, frequent, up to 250 yds.

Barbarea vulgaris. Lover's Walk, Matlock Bath, and a few other places.

Nasturtium officinale. D. Abundant about the streams up to 250 yds. — *N. palustre*. Near the stream in Cromford Dale.—*N. amphibium*. By the Cromford Canal at Whatstandwell.

Armoracia rusticana. Via Gellia, &c.; an occasional stray from cottage gardens.

Thlaspi virens. Matlock Tor, Heights of Abraham, &c., 150 to 250 yds.; always associated with *Arenaria verna* on the *débris* of the lead mines.

Capsella Bursa-pastoris. D. A common roadside weed up to 300 yds.

Reseda Luteola. Limestone quarries in Matlock Dale. No *lutea* seen.

Helianthemum vulgare. D. Common on the limestone banks up to the heights of Abraham, 350 yds.

Viola palustris. Only seen on Tansley Moor; gritstone. — *V. odorata*. Seen once at the top of Bonsall, near a farmhouse.—*V. hirta*. Dovedale, Via Gellia, Cromford Dale, and other limestone woods. — *V. sylvatica*. D. Woods up to the heights of Abraham, 350 yds.—*V. tricolor*. Cultivated ground up to 250 yds., both type and var. *arvensis* and a form just half-way between them. —*V. lutea*. Matlock Tor and heights of Abraham.

Drosera. None seen.

Polygala vulgaris. D. Grassy banks up to 350 yds.; frequent.

Silene inflata. Matlock bank and hill-side, ascending from Matlock Bridge to Bonsall.—*S. nutans*. Limestone cliffs in Dovedale. Not seen about Matlock.

Lychnis vespertina. Roadside at Whatstandwell.—*L. diurna*. D. Common in woods up to 300 yds.

Cerastium glomeratum. Via Gellia.—*C. triviale*. D. Common in grassy places up to 350 yards.

Stellaria media. D. Common up to 300 yds.—*S. Holostea*.—*S. graminea*. D. Ascends to 300 yds.—*S. uliginosa*. Damp places up to 300 yds.

Arenaria trinervia. Dry bank on the hill, ascending from Matlock Bridge to Bonsall.—*A. serpyllifolia*. D. Walls and dry banks, frequent up to 300 yds., both type and var. *leptoclados*.

Alsine verna. Matlock Tor, Masson, Bonsall, &c., 150 to 300 yds., abundant; always associated with lead mines.

Sagina apetala. Gritstone wall at Whatstandwell Railway Station.—*S. procumbens*. Frequent.

Spergularia rubra. Gritstone quarry over the church at Matlock bank, 250 yds.

Hypericum calycinum. Lover's Walk, Matlock Bath; alien.—*H. perforatum*. D. Frequent in the limestone woods up to 300 yds.—*H. tetrapterum*. Dovedale, Via Gellia, &c.; about the streams.—*H. pulchrum*. Gritstone quarry over Matlock bank, 250 yds.—*H. hirsutum*. Dovedale, Via Gellia, Matlock Tor, and other limestone woods; abundant.

Malva moschata. Dovedale, Via Gellia, and by the Cramford Canal at Whatstandwell.—*M. rotundifolia* and *sylvestris*. Near houses at Cromford; perhaps introduced.

Tilia grandifolia. Roadside at Whatstandwell, and by the Derwent at Matlock Bath.—*T. intermedia*. Limestone cliffs of Matlock Tor.

Linum catharticum. D. Dry banks, frequent, up to 350 yds.—*L. usitatissimum*. A few plants by roadsides.

Geranium pratense. D. Common in the limestone woods up to 300 yds.—*G. columbinum*. Foot of cliff in Dovedale.—*G. lucidum*. D. Walls and rocks, Via Gellia, &c.—*G. Robertianum*. D. Common in the limestone woods up to 350 yds.

Oxalis Acetosella. D. Shaded woods up to 350 yds.; frequent.

Impatiens parviflora. A few plants in Cramford Dale, and at the Lover's Walk, Matlock Bath.

Ilex Aquifolium. D. Frequent up to 300 yds.

Euonymus europæus. Via Gellia and Matlock Tor.

Rhamnus catharticus. D. Via Gellia, Matlock Tor, and hill-side east of Bonsall up to 250 yds.

Acer Pseudo-platanus. D. Everywhere in the woods.—*A. campestre*. D. Common in the limestone dales up to 300 yds.

Ulex europæus. D. Mainly on the gritstone; not plentiful.—*U. Gallii*. On the gritstone at all levels from the railway side at Whatstandwell up to 300 yds.; very fine on Tansley Moor.

Genista anglica. Tansley Moor, 300 yds., over gritstone, amongst the heather.—*G. tinctoria*. East slope of Matlock Tor.

Sarothammus. None seen except in gardens.

Ononis arvensis. West slope of Matlock Tor.

Anthyllis Vulneraria. Limestone banks over Bonsall and Matlock Bath, up to 300 yds.

Medicago lupulina. D. Grassy places up to 250 yds.

Trifolium pratense. D. Common in grassy places up to 350 yds.—*T. medium*. Frequent in woods and thickets.—*T. hybridum*. Roadsides and forage fields.—*T. repens*. D. Everywhere common.—*T. minus*. Lumsdale, on gritstone.

Lotus corniculatus. D, Common up to 350 yds.—*L. major*. Thickets and damp grassy places up to 300 yds.

Vicia Cracca. Hedges; not common.—*V. sepium*. D. Common in woods and grassy places up to 300 yds.—*V. sativa*. Seen in cultivation only.

Lathyrus pratensis. D. Fields and thickets up to 300 yds.; common.

Prunus spinosa. D. Common in woods and hedges up to 300 yds.—*P. insititia*. Seen in the Via Gellia, &c.—*P. Padus*. Plentiful in the Via Gellia.

Spiræa Ulmaria. D. Common up to 300 yds.

Agrimonia Eupatoria. Frequent up to 250 yds.

Sanguisorba officinalis. Hedge-bank at Whatstandwell.

Poterium Sanguisorba. D. Dry limestone banks, everywhere common, up to the Heights of Abraham, 350 yds.

Alchemilla vulgaris. D. Common in grassy places up to 300 yds.

Potentilla Fragariastrum. D. Walls and hedge-banks; frequent.—*P. Tormentilla*. Ascends to 350 yds., but seldom seen on the limestone.—*P. reptans* and *Anserina*. D. Frequent, both ascending to 300 yds.

Fragaria vesca. D. Common in woods up to 350 yds.

Rubus Idæus. D. Common in woods up to 300 yds.—*R. Lindleianus*. Quite characteristic in woods and thickets at Whatstandwell and in the gritstone quarry over Matlock bank. We looked for *suberectus* forms, and could not find any.—*R. rhamnifolius*. Once seen on the slope of the hill west of Matlock Bridge Railway Station.—*R. discolor*. Common about Tissington and in Dovedale. Seen once only at Matlock, in a lane at the top of Bonsall.—*R. thyrsoidens*. Thickets by the side of the road below the railway south of Whatstandwell Station.—*R. leucostachys*. D. Common everywhere in woods and thickets, ascending to 300 yds. in the Masson Woods.—*R. amplificatus*. Thickets at Whatstandwell; plentiful. We never once met with *R. umbrosus*, which is generally a prevalent type in hilly tracts in the North of England.—*R. Sprengelii*. Seen once, in hedges by the side of the road between Whatstandwell and Wirksworth.—*R. Radula*. D. Frequent, ascending to 300 yds. in the Masson Woods.—*R. pallidus*. D. Everywhere common in woods, ascending to 300 yds. on the heights of Abraham.—*R. dumetorum* var. *concinnus* (*R. tenuiarmatus* Lees) is one of the commonest brambles of the district,

ascending to 300 yds.; var. *ferox*, abundant in the Via Gellia and at Whatstandwell. — *R. corylifolius*. D. Common in woods and thickets up to 300 yds.; generally var. *sublustris*, but good *conjungens* seen in the Via Gellia.—*R. cæsius*. D. Common in woods and thickets, ascending to 300 yds. over Matlock Bath, both the type and varieties.

Rosa mollissima. Woods and thickets up to 300 yds., both the type and var. *cærulea*.—*R. tomentosa*. D. Frequent up to 300 yds. in a wide range of forms, of which the most interesting was one with *scabriuscula* leaves and sepals falling whilst the fruit was still green, on the top of the ridge of hill between Bonsall and Matlock Bridge.—*R. canina*. D. Everywhere common up to 300 yds. in a variety of forms, amongst which, in company with the Rev. W. M. Rogers and Mr. Bagnall, we specially noted *lutetiana*, *sphærica*, *dumalis*, *biserrata*. *urbica*, *frondosa*, *arvatica*, *andevagensis*, *Reuteri*, *subcristata*, *coriifolia*, and *Watsoni*, the last at Tissington. — *R. arvensis*. D. Everywhere common in woods and thickets, ascending to 300 yds.

Cratægus monogyna. D. Common in woods and hedges up to 300 yds. Var. *laciniata* on Matlock Tor, &c.

Pyrus rupicola. Limestone cliffs of Matlock Tor; seen also on cliffs in Dovedale, but only on the Staffordshire side of the stream. —*P. Aucuparia*. D. Ascending to 350 yds., but scarcely seen in the limestone dales. — *P. Malus*. D. Common in woods and thickets, ascending to 300 yds.

Lythrum. Not seen.

Epilobium angustifolium. By the stream in the Via Gellia; perhaps introduced.—*E. hirsutum*. D. Abundant by the streams. —*E. parviflorum*. D. With the last; frequent.—*E. montanum*. D. Common in woods up to 300 yds. Two curious forms noted, one with several of the leaves of the main stem arranged in threes, and another tall and much branched, with flowers nearly as large as in *E. hirsutum*, with which it grew, near the Via Gellia Colour Works.—*E. roseum*. Roadside at Matlock Bridge.—*E. obscurum*. Lumsdale Reservoirs, &c.—*E. palustre*. Stream-side on the moor over Tansley.

Circæa lutetiana. D. Frequent in woods and thickets. We could only find *lutetiana*, not *alpina*, which is recorded at Matlock Bath.

Callitriche platycarpa. Ponds and slow streams.

Myriophyllum. None seen.

Ribes Grossularia. Roadside in the Via Gellia, &c.; scattered bushes only.

Sedum Fabaria. Limestone rocks in Dovedale; sparingly. — *S. album*. Walls in Matlock Dale; doubtless a garden escape.— *S. acre*. Walls and rocks, both of grit and sandstone; frequent.

Saxifraga tridactylites. Common on walls.—*S. hypnoides*. Limestone *débris* in Dovedale and over Bonsall.

Chrysosplenium oppositifolium. Damp shady places in the Via Gellia, &c.

Parnassia palustris. Limestone banks over Matlock Bath, &c.

Hydrocotyle vulgaris. Tansley Moor, on gritstone. Avoids the limestone.

Sanicula europæa. Woods up to 300 yds. over Matlock Bath.

Helosciadium nodiflorum. D. Very abundant about the streams.

Ægopodinm Podagraria. D. Roadsides up to 300 yds. on Matlock bank.

Pimpinella Saxifraga. D. Common on the limestone banks up to the heights of Abraham, 350 yds. A form with bright red flowers at Bonsall.—*P. magna.* D. Common on limestone banks up to 300 yds. on the top of the ridge between Bonsall and Matlock Bridge.

Æthusa Cynapium. Cultivated ground up to 300 yds.

Angelica sylvestris. D. Damp woods ; frequent.

Heracleum Sphondylium. D. Dry banks up to the heights of Abraham, frequent, 350 yds. Varieties noted with laciniated leaves and small orbicular mericarps.

Daucus Carota. D. Dry banks ; frequent.

Torilis Anthriscus. D. Common on dry banks up to the heights of Abraham, 350 yds.

Chærophyllum sylvestre. Woods and pastures ; frequent. — *C. temulum.* D. Hedge-banks ; frequent.

Myrrhis odorata. Stream-sides and lanes up to 300 yds. over Bonsall ; very wild-looking.

Conium maculatum. Waste ground in the Via Gellia.

Hedera Helix. D. Walls, rocks, and trees ; common at all levels up to 350 yds.

Cornus sanguinea. D. Everywhere common in the limestone woods up to 300 yds.

Sambucus nigra. Woods and hedges up to 300 yds. ; frequent.

Viburnum Opulus L. D. Woods up to 300 yds. ; frequent.

Lonicera Periclymenum. D. Like the last.

Galium verum and *Cruciata.* D. Common at all levels up to 350 yds. — *G. saxatile.* Heaths up to 350 yds. ; mainly on gritstone.—*G. sylvestre.* D. Common on the dry limestone banks up to 350 yds. — *G. palustre.* Common in swamps at all levels. — *G. Aparine.* D. Cultivated ground up to 300 yds.

Asperula odorata. Frequent in the woods.

Valeriana officinalis. D. Frequent in woods up to 300 yds.

Dipsacus pilosus. Via Gellia and Cromford Valley ; plentiful.

Scabiosa Succisa. D. Grassy places up to 300 yds. ; common. —*S. Columbaria* and *arvensis.* D. Everywhere common on dry banks at all levels up to 350 yds. on Masson heights.

Carduus nutans. D. Dry banks ; frequent up to 300 yds.—*C. crispus.* D. Roadsides ; frequent. — *C. lanceolatus, palustris,* and *arvensis.* D. Common at all elevations, up to Masson heights, 350 yds.

Carlina vulgaris. Dovedale and Matlock Tor.

Arctium minus. D. Frequent in the woods, both type and other forms. No *majus* anywhere seen.

Serratula tinctoria. Matlock Tor.

Centaurea nigra. D. Common in pastures up to 300 yds., both

extreme *nigra*, and in dry places a form approximating towards *decipiens*.—*C. Scabiosa*. Matlock Tor, &c.

Chrysanthemum Leucanthemum. D. Common in grassy places. A form with many heads to a stem and more deeply-cut leaves noted at Whatstandwell.

Matricaria Parthenium. D. Established by roadsides in several places.—*M. inodora*. In cultivated ground up to 300 yds.

Tanacetum vulgare. Plentiful on the banks of the Derwent.

Achillea Millefolium. D. Pastures at all levels up to 350 yds.; common. — *A. Ptarmica*. Lumsdale. Fine *A. serrata* seen in gardens at Matlock Bath.

Artemisia vulgaris. Roadsides and waste ground; frequent.

Gnaphalium uliginosum. Roadside at Whatstandwell.

Filago. None seen.

Senecio vulgaris. D. Common up to 300 yds. — *S. erucifolius*. Roadside between Tissington and the Peveril Inn, Dovedale; not seen about Matlock.—*S. Jacobæa*. D. Common at all levels up to 350 yds.—*S. aquaticus*. D. Stream-sides, frequent; very luxuriant in the Via Gellia.

Inula Conyza. Limestone banks in the Via Gellia and on Matlock Tor. — *I. dysenterica*, Roadsides at Tissington at Whatstandwell.

Bellis perennis. D. Common at all levels up to 350 yds.

Solidago Virgaurea. Woods; not common.

Tussilago Farfara. D. Common in waste ground up to 300 yds.

Petasites vulgaris. D. Abundant by the streams.

Eupatorium cannabinum. D. Woods and stream-sides up to 300 yds.; common.

Lapsana communis. D. Roadsides; frequent.

Hypochæris radicata. D. Grassy places at all levels up to 350 yds.

Leontodon hispidus and *autumnalis*. D. Grassy places at all levels up to 300 yds.

Picris hieracioides. D. Limestone banks; frequent.

Tragopogon minor. Hill-side west of Matlock Bridge Station.

Taraxacum officinale. D. Common at all levels up to 350 yds.

Lactuca muralis. D. Common in woods and on shaded cliffs up to 300 yds.

Sonchus oleraceus, *asper*, and *arvensis*. D. All three frequent.

Crepis virens. D. Frequent in pastures up to 300 yds. No *paludosa* seen.

Hieracium Pilosella. D. Common at all levels up to 350 yds. —*H. vulgatum*. Cliffs up to 350 yds.; not common, and we were surprised not to see either *cæsium* or *murorum*.—*H. boreale*. Common in woods and on hedge-banks up to 300 yds.

Jasione montana. Lumsdale, in sandy soil over gritstone only; not seen in the limestone dales.

Campanula latifolia. Matlock Tor and lanes over Bonsall on the eastern ridge up to 300 yds.—*C. rotundifolia*. D. Grassy places; common at all levels up to 350 yds.

Vaccinium Myrtillus and *Vitis-idæa*. Abundant on Tansley Moor and other gritstone ridges.

Erica Tetralix and *cinerea*. Heaths up to 300 yds.
Calluna vulgaris. With the last; plentiful.
Fraxinus. Common in the woods up to 300 yds.
Ligustrum vulgare. Truly wild on Matlock Tor and the hill-side east of Bonsall.
Erythræa Centaurium. Limestone slope in Dovedale.
Gentiana Amarella. D. Pastures on the limestone at all elevations up to the heights of Abraham, 350 yds.
Convolvulus arvensis. Hedge-bank at Matlock bank, 250 yds. A narrow-leaved variety. — *C. sepium*. Frequent in hedges and cultivated ground up to 300 yds.
Solanum Dulcamara. By the stream in Cromford Dale.
Verbascum Thapsus. Limestone banks.—*V. nigrum*. Type and a hybrid between this and the last in a quarry on the hill-side west of Whatstandwell. Perhaps a relic of cultivation.
Scrophularia Balbisii. Stream-sides, common; up to 250 yds. in Lumsdale.—*S. nodosa*. Common in woods up to 300 yds. over Matlock Bath.
Digitalis purpurea. Gritstone heaths. Avoids the limestone.
Antirrhinum majus. Garden walls at Cromford.
Linaria Cymbalaria. Common on walls. — *L. vulgaris*. Dry banks; frequent. — *L. minor*. On ballast at Whatstandwell, with poppy and *Atriplex*.
Veronica agrestis. D. Cultivated ground, common, up to 300 yds. —*V. Buxbaumii*. Seen in several places up to 300 yds.—*V. arvensis* and *serpyllifolia*. Wall-tops; not common. — *V. Chamædrys*. D. Grassy places at all levels up to 350 yds. A form noted with distinctly-petioled upper leaves by the Derwent below Matlock Tor. —*V. montana*. Via Gellia, in shaded woods.—*V. Anagallis*. Banks of the Dove, and about the reservoirs of Cromford Dale. — *V. Beccabunga*. D. Common in damp places.
Euphrasia officinalis. D. Dry banks; common at all elevations up to the Heights of Abraham, 350 yds.
Bartsia Odontites. D. Grassy places; not common.
Rhinanthus Crista-galli. Grassy places.
Pedicularis and *Melampyrum*. None seen.
Orobanche. None seen.
Verbena officinalis. Bottom of the Via Gellia.
Mentha sylvestris. Cromford Dale and bottom of the Via Gellia. —*M. piperita*. Fully native. By the reservoirs in Cromford Dale and the Cromford Canal, south of Whatstandwell Station.—*M. hirsuta*, *paludosa*, and *sativa*. All three frequent. — *M. arvensis*. Cultivated ground; rare.
Thymus Serpyllum. D. Common on dry banks at all elevations up to 350 yds.
Origanum vulgare. D. Everywhere common in the limestone dales up to 300 yds.
Calamintha Clinopodium. D. Frequent in woods and thickets up to 300 yds.—*C. Acinos*. Limestone bank in Dovedale; sparingly.
Nepeta Glechoma. D. Hedge-banks and stony woods; frequent up to 300 yds.

Prunella vulgaris. D. Everywhere common in grassy places up to 350 yds.

Scutellaria galericulata. Lumsdale Reservoirs, abundant, and banks of the canal at Whatstandwell.

Stachys Betonica. Matlock Tor, &c.; not plentiful.—*S. palustris*. About the Derwent at Matlock Bridge.—*S. sylvatica*. Common in woods up to 300 yds.

Galeopsis Tetrahit. D. Cultivated fields; not common.

Lamium purpureum. D. Roadsides and cultivated ground.—*L. album*. Common by roadsides up to Matlock bank, 250 yds.—*L. Galeobdolon*. D. Everywhere common in the limestone woods up to 350 yds.

Ajuga reptans. D. Woods and fields, common, up to 300 yds.

Teucrium Scorodonia. D. Dry banks both amongst the limestone and gritstone; frequent.

Lithospermum officinale. Limestone banks in the Via Gellia.

Myosotis cæspitosa. Very fine by the stream in the Via Gellia.—*M. palustris*. D. Abundant by the streams.—*M. repens*. Tansley Moor.—*M. arvensis*. Cultivated and waste ground.

Symphytum officinale. Via Gellia, and by the canal-side at Whatstandwell.

Primula vulgaris and *officinalis*. D. Both common.

Lysimachia nemorum. Damp woods; not common.

Plantago major, *media*, and *lanceolata*. D. All three common at all levels up to 350 yds.

Chenopodium album. Cultivated ground up to 300 yds.; common.—*C. Bonus-Henricus*. Roadsides at Bonsall and Cromford.

Atriplex angustifolia. Type and var. *erecta* common in cultivated ground up to 300 yds.—*A. Smithii*. Less common than the last.

Rumex conglomeratus and *sanguineus*. D. Frequent by the stream-sides.—*R. obtusifolius*. D. Common at all levels up to 300 yds.—*R. pratensis*. By the stream in Dovedale and the Cromford Canal at Whatstandwell.—*R. crispus*. Roadsides; frequent.—*R. Acetosa* and *Acetosella*. Dry banks at all levels up to 350 yds.

Polygonum Convolvulus.—Cultivated ground up to 300 yds.—*P. aviculare*. D. Roadsides at all levels, frequent; several forms.—*P. Persicaria*. Cultivated fields up to 300 yds.; common. Neither *Hydropiper* nor *lapathifolium* seen.

Euphorbia Helioscopia and *Peplus*. Common in cultivated ground up to 300 yds.—*E. exigua*. Railway side at Whatstandwell.

Mercurialis perennis. D. Abundant in the limestone woods up to 300 yds.

Parietaria diffusa. Walls at Cromford and Bonsall.

Urtica dioica. D. Common at all levels up to 350 yds. No *urens* seen.

Ulmus montana. D. Everywhere common in the woods. No *campestris* seen, except a few obviously-planted trees of the typical form.

Quercus Robur. D. Frequent in woods; var. *sessiliflora* at Whatstandwell.

Fagus sylvatica. Wild-looking in the limestone woods of the Via Gellia.

Corylus Avellana. D. Very common in the limestone woods.

Alnus glutinosa. D. Common by the streams up to 300 yds.

Populus nigra. Planted woods. No *tremula* seen.

Salix fragilis. Stream-sides in several places. No *pentandra*, *alba*, nor *triandra* seen.—*S. purpurea*. By the reservoirs in Cromford Dale.—*S. viminalis*. Stream-sides; frequent.—*S. cinerea* and *Caprea*. D. Common in woods and hedges up to 300 yds.

Pinus sylvestris. Self-sown about the Lumsdale grit quarries, &c.

Taxas baccata. Matlock Tor and over Bonsall, truly wild, but in small quantity; and *Juniperus*, which we should have expected to be plentiful, we never once saw.

Sparganium ramosum. D. Ponds and streams; frequent.

Lemna minor. Ponds.

Potamogeton natans. In the canal at Whatstandwell.—*P. polygonifolius*. Rills on Tansley Moor. — *P. perfoliatus* and *pectinatus*. In the canal at Whatstandwell. — *P. crispus*. Reservoirs at Cromford, and in the Dove.

Sagittaria. In the canal south of Whatstandwell Station.

Alisma Plantago. D. Slow streams and ponds, frequent, both type and var. *lanceolatum*.

Elodea canadensis. Cramford Reservoirs, and in the canal at Whatstandwell.

Epipactis latifolia. Woods, in several places. We were, of course, too late for the Orchids and other petaloid monocotyledons.

Tamus communis. D. Common in the limestone woods up to 250 yds. No *Bryonia* seen.

Convallaria majalis. Abundant on the limestone slopes of the Via Gellia.

Scilla nutans. Woods up to 300 yds.

Luzula multiflora. Tansley Moor, both type and var. *congesta*.

Juncus conglomeratus. Dovedale and Tansley Moor. — *J. effusus* and *glaucus*. D. Both frequent in damp places. — *J. acutiflorus*, *lamprocarpus*, *squarrosus*, and *supinus*. Tansley Moor, &c. — *J. bufonius*. Roadsides; not common.

Scirpus palustris. Abundant at the Lumsdale Reservoirs. — *S. setaceus*. Damp roadsides; not common.

Eriophorum angustifolium. Swamps on Tansley Moor.

Carex muricata. Ridge between Bonsall and Matlock Bridge, 300 yds.—*C. stellulata* and *binervis*. Swamps on Tansley Moor.—*C. sylvatica* and *remota*. Via Gellia. — *C. glauca*. Dry banks; frequent at all levels up to 350 yds. — *C. ampullacea*. By the reservoirs in the Cromford Valley.

Anthoxanthum odoratum. D. Pastures at all levels; common.

Digraphis. D. Common by the streams.

Phalaris canariensis. Roadsides, casual, with *Linum usitatissimum*.

Phleum pratense. D. Pastures; common.

Agrostis vulgaris. D. Common at all levels up to 350 yds. *A. nigra* With., which Mr. Bagnall first pointed out to us, as abundant as typical *vulgaris*.

Phragmites communis. Reservoirs; rare.

Aira cæspitosa. D. Common at all levels up to 350 yds.—*A. flexuosa.* Gritstone heaths. Avoids the limestone dales.

Avena pratensis. D. Dry limestone banks; frequent. — *A. elatior.* D. Common at all levels up to 300 yds.

Holcus mollis and *lanatus.* Common at all levels up to 350 yds.

Triodia decumbens. Tansley Moor.

Kœleria cristata. Limestone banks in Dovedale.

Molinia cærulea. Tansley Moor, over gritstone; not seen in the limestone dales.

Melica uniflora. D. Common in the woods up to 300 yds.

Catabrosa aquatica. Canal-side at Whatstandwell.

Glyceria fluitans. Swamps up to 300 yds.—*G. plicata.* By the stream in Dovedale.—*G. aquatica.* By the Cromford Canal south of Whatstandwell.

Poa annua, pratensis, and *trivialis.* D. Common at all levels. — *P. nemoralis.* Woods of the Via Gellia, &c. — *P. compressa.* Limestone walls at Whatstandwell, &c.

Briza, Cynosurus, and *Dactylis.* D. Common at all elevations.

Festuca ovina. D. Frequent; *tenuifolia* on the gritstone heaths, and *duriuscula* in the limestone dales.—*F. pratensis.* Grassy places; frequent.

Bromus giganteus. D. Woods and thickets; much less common than *B. asper.* — *B. asper.* D. Common and very luxuriant in woods up to 300 yds. At the Lakes and in Yorkshire this and the last are equally plentiful everywhere in the woods of the mid-agrarian zone.—*B. sterilis* and *mollis.* Dry banks and roadsides.

Brachypodium sylvaticum. D. Everywhere common in the woods up to 300 yds. We expected *pinnatum,* but could not find any.

Triticum caninum and *repens.* D. Frequent up to 300 yds.

Lolium perenne. D. Common at all levels; *italicum* introduced in many places.

Nardus stricta. Dovedale and Tansley Moor.

Pteris. Frequent both on grit and limestone.

Lomaria Spicant. Gritstone heaths. Avoids the limestone.

Asplenium Ruta-muraria. Walls, both of grit and limestone.

Athyrium. Rare in the limestone dales.

Scolopendrium. Limestone cliffs. Avoids the gritstone.

Cystopteris fragilis. Limestone cliffs.

Nephrodium Filix-mas and *dilatatum.*—Woods at all levels, both of grit and limestone. No *Oreopteris* seen.

Polypodium vulgare. D. Limestone rocks.

Lycopodium. None seen.

Equisetum arvense. D. Common at all levels. — *E. palustre.* Damp places.—*E. maximum.* About the stream in Cromford Dale. —*E. limosum.* Cromford and Lumsdale Reservoirs, plentiful, the *fluviatile* form.

ON *DIDYMOPLEXIS SYLVATICA* (*LEUCORCHIS SYLVATICA* BLUME).

BY H. N. RIDLEY, M.A., F.L.S.

THIS rare orchid was described by Blume (Orchid. Archip. Ind., p. 147), from a sketch and notes furnished by Van Hasselt, who met with it at Bantam in Java. There is a fine suite of specimens, which appear to be identical with Blume's plant, in the Javan collection of Horsfield, named by Mr. J. J. Bennett *Nematophyllum productum*, but apparently unpublished. Unfortunately the flowers are so delicate that they have been too much crushed in pressing to make out their structure quite satisfactorily, but I have been able to satisfy myself that the plant is a distinct species from *D. pallens* Griff. (*Apetalon minutum* Wight, 'Icones,' 1758), a native of India, differing in the considerably larger flowers, the ovate obtuse petals, and the slender almost footless column. The two lateral sepals are connate, as in that species, but the lobe formed by them is ovate, entire, and blunt, and, except for the venation, bears no trace of its bifid character, whereas in *D. pallens* it is distinctly emarginate and bilobed. The rhizome is creeping, and bears at intervals fusiform tuberous swellings. The stems are about six inches to a foot in height, and leafless, except for a few loose membranous bracts. They bear numerous flowers, only a few being open at a time, and as these appear the stem seems to lengthen considerably, so that eventually it attains a height of about a foot, with one or two flowers at the top, and a number of short bracts, denoting the number of flowers which, not having been fertilised, have fallen off and disappeared. As in the other species, when a flower is fertilised the pedicel begins to lengthen and increase in thickness till the capsule is ripe and splits, by which time it has attained the height of sometimes as much as nine inches. Mr. Hemsley (Journ. Linn. Soc., xx., p. 310), suggests that this extension of the pedicel might serve to carry up the fruit above the decaying vegetable matter in which the plant grows. The Indian plant grows among bamboo-clumps and in leafy wet spots, and if the fall of leaves was very great in such places it would explain the reason not only for this increase in length of the pedicel, but also for the elongation of the flowering axis which is so unusual in the Orchideæ. The flowers, according to Blume, are whitish; the petals and sepals are ovate, obtuse and entire; the lip is short, blunt and entire, and is ornamented with small, transverse, dark markings; the column is slender and almost straight, narrowed towards the base, and with a very short foot; the capsule is an inch long and $\frac{1}{8}$ in. diameter. I append a diagnosis.

DIDYMOPLEXIS SYLVATICA (*Leucorchis sylvatica* Bl. Orch. Archip. Ind. p. 147).—Saprophyton; rhizomate repente tuberoso, tuberibus fusiformibus; caulibus aphyllis, in floratione increscentibus; bracteis ovatis obtusis brevibus; floribus majoribus, sepalo postico ovato obtuso integro, petalis subæqualibus subsimilibus

eo adnatis, sepalis lateralibus in labio late ovato obtuso integro connatis, labello breviore obtuso indiviso, columna gracili suberecto, pede brevissimo; capsula oblonga.

EOMECON: GENUS NOVUM, E FAMILIA *PAPAVERACEARUM*.

Auctore H. F. Hance, Ph.D., Soc. Linn. Lond. Sod., cet.

Sepala in calycem gamophyllum, acuminatum, sub anthesi hinc latere longitudinaliter fissum, caducum, coalita. Petala 4, alba, orbiculari-elliptica, symptyxi biseriatim imbricata, haud corrugata. Stamina ultra 70; filamenta libera, filiformia; antheræ erectæ, oblongæ, biloculares, loculis connectivo iis duplo latiore separatis, longitudinaliter dehiscentibus. Ovarii placentæ 2, nerviformes; stylus distinctus, apice lobato-dilatatus, lobis 2 erectis, intus stigmatosis, cum placentis alternantibus. Capsula . . . . . Semina . . . .

Herba rhizomate perenni, late repente, ramoso, succo croceo. Folia e rhizomatis gemmis plurima, cæspitosa, cordiformia, palmativenia, longipetiolata, ptyxi involuta. Scapi apice racemosi, floribus leviter fragrantibus.

390 **E. chionantha**;* glaberrima, foliis carnosulis subcoriaceis cordatis cordato-sagittatis v. reniformibus acutis v. obtusis sinu basali clauso v. aperto auriculis obtusis margine sinuatis lobulis apice denticulo minuto glanduloso albido subinde rorante notatis supra subnitidis subtus opacis præter venas palmatas et reticulatas dealbatis 2–4 poll. diametro petiolo carnoso glaucescenti basi (*Arorum* ad instar) vaginante 7–12 pollicari suffultis, scapis e vaginis foliorum adsurgentibus 7–14 poll. longis apice laxe paniculato-racemosis, bracteis bracteolisque lanceolatis acuminatis, pedicellis 2–24 lin. longis erectis, calycibus adhuc inapertis in rostrum attenuatis venosis 5 lin. longis, petalis teneris 10 lin. longis 7 lin. latis, genitalibus corolla triplo brevioribus.

Ad ripas rivulorum, in jurisdictione Wai-tsap, prov. Kwang-si, 100 m. p. a Cantone, occasum versus, m. Aprili 1883, collegit rev. B. C. Henry. (Herb. propr. n. 22218.)

Genus omnino distinctum, *Stylophoro* et *Sanguinariæ* interponendum: illi, petalorum numero, styli longiusculi lobis cum placentis alternantibus †; huic, florum colore, inflorescentia scaposa, foliorumque indole, accedens; ab utroque foliis radicalibus, cæspitosis, floribus racemosis, calyce synsepalo, staminibus numerosioribus, diversum.

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* Vocabulum Μήκων est feminini generis.

† Illustris. Asa Gray lobos stylinos etiam *Sanguinariæ* cum placentis alternantes perperam descripsit et depingi curavit. (Ill. N. Am. Pl. i. 115, t. 49, f. 6.) Conf. Benth. & Hook. f. Gen. Pl. i. 53; Baillon, Hist. d. pl. iii. 141.

NOTE ON THE BRITISH *GYMNOSPORANGIA*.

By Charles B. Plowright.

The *Gymnosporangia* are represented in this country by three species, viz., *G. sabinæ*, *G. juniperinum*, and *G. clavariæforme*. Since their life-history was worked out by Œrsted in 1865, when he showed they were connected as teleutospores with *Ræstelia cancellata*, *R. cornuta*, and *R. lacerata*, they have received comparatively little attention until Rathay undertook an extensive series of cultures with them, the results of which he published in 1882; from which it appears that their respective æcidospores occur upon several host plants, as under :—

Teleutospores.	*Æcidiospores.*
Gymnosporangium clavariæforme.	Cratægus Oxyacantha. C. monogyna. Pyrus communis. Sorbus torminalis.
Gymnosporangium sabinæ	Pyrus communis.
Gymnosporangium juniperum ...	Sorbus Aucuparia. Aronia rotundifolia. Pyrus Malus. Cydonia vulgaris. Sorbus Aria.

During the years 1882, 1883, and 1884 I have performed a number of cultures with Fungi, which corroborate Rathay's results as far as they have gone, except in one instance. I find, as Rathay does, that both *G. clavariæforme* and *G. sabinæ* produce their æcidiospores upon *Pyrus communis* and *Cratægus Oxyacantha*. This last result is contrary to Rathay's observations, and from various reasons I believe that *Juniperus Sabina* has two *Gymnosporangia* upon it in this country. These two species have hitherto been confounded; nor am I at the present time in a position to point out the specific differences of the teleutospores, although the resulting æcidia are sufficiently distinct in the size of their spores, the form of their pseudoperia, the colour of the spots from which they arise, and in the structure of the pseudoperidial cells. My attention was first drawn to this point by my friend Mr. W. Marshall, of Ely, who sent me a specimen of hawthorn affected with the *Ræstelia* which grew in close proximity to a savine-bush, near which no other juniper grew. I hope to be able to clear this matter up next year, and possibly may thus be enabled to throw some light upon the life-history of the *Ræstelia* on *Mespilus germanica*, a fungus which is not uncommon in this neighbourhood and one that Rathay was unable to produce artificially. My present idea is that it is connected with this second species of *Gymnosporangium* that occurs upon *Juniperus Sabina*, because its spore-measurement and the wrinkling of the pseudoperidial cells are the same as those of the *Ræstelia* I this year produced upon hawthorn from *G. sabinæ* sent to me by Mr. Marshall. I would take this opportunity of

drawing attention to the fact first pointed out by Rees in 1870, that *G. sabinæ* has two kinds of spores, one smaller, paler, and narrower than the other.

SHORT NOTES.

Juncus diffusus Hoppe.—I found this rush this summer on North Leigh Heath, in Oxfordshire, and shortly after met with it in another Oxfordshire locality, by Grove Wood near Kingham, close to the Gloucestershire boundary, and again in marshy ground near Oddington in the latter county. In all these places *glaucus* and *effusus* grew with it. In addition to Babington's very good description, another character mentioned in 'English Botany' appears constant—the darker colour of the sheaths. I find that *diffusus* has very glossy black sheaths, as in *glaucus*; but this is not shown in the crude colouring of the plates in 'English Botany.' In *effusus* they are dull brown, varying much in hue; the stems of *diffusus* are much stronger, bearing the strong pull necessary to uproot the plant; *effusus* is very weak. From *glaucus* the continuous pith and smaller capsules readily distinguish it. I cannot help questioning the opinion held by Mr. Watson that *diffusus* is not a hybrid or any relation of *glaucus*, although one feels great hesitation in differing from such an accurate observer. Here, in this west Oxford habitat, *diffusus* was more abundant than what I imagine to be its parents; and as with other undoubted hybrids there was great variation, not only in colour and striation of stem, but even in the consistence of the plant and the continuity of pith. On the whole, I should say of the plants growing there, supposing them to be hybrids, that *glaucus* was the stronger parent, or rather, that its characters had been transmitted more freely to its progeny. In the Gloucestershire localities a specimen of *glaucus* occurred with very diffuse and elongated panicle, which was situated much lower on the stem than usual; its peculiarities were probably owing to its growth in dense shade, caused by a thicket of *Rubus cæsius*, &c.—G. C. Druce.

Abnormal Flowers of Tropæolum.—One of the most curious instances of abnormal growth I have ever seen has been found in my garden during the present autumn. There are three beds of the Tropæolum, and examples of the malformation have been found in each of them; but this, perhaps, is the less to be wondered at, as the cuttings from which the plants are grown were all taken last autumn from the same plant. The spurs of many of the flowers are truncated. Some have lost merely the tip of the spur; others have lost half, or three-quarters; and in a few instances nothing remains but a short stump. On examination, however, the spurs are found not to be lost through some accident, such as the attack of insects, as would at first be supposed; nor are they simply suppressed; but they are actually turned outside in, the points of the inverted spurs being seen in the interior of the flower, above

the insertion of the stamens. But the peculiarity does not end here; for in the majority of cases where the spurs are inverted they have become also forked at the tip, and this attempt to form a double, sometimes a triple spur, can be traced to some extent externally; though it is only the inverted portion which is actually separated into two or three points.—Robert Holland.

Lejeunia microscopica Tayl.—I am able to add another station for this rare hepatic, having found it in quantity in Nant Francon, N. Wales, this August.—W. H. Pearson.

Bupleurum tenuissimum L. in Huntingdonshire. — The first notice of this as a Hunts plant occurs in the Appendix to Ray's 'Catalogus Plantarum Cantabrig,' 1663, p. 3:— 'Auricula leporis minima J. B. The smallest Hares-ear. By the way-side as you ride to St. Neotes beyond Elles-ly. This I have found in sundry other places in England, viz. in the road to Stilton a little beyond Huntingdon." The first of these two localities Professor Babington, in his admirable 'Flora of Cambridgeshire,' claims for that county; but probably the plant extended into Huntingdonshire, within the border of which the Rev. W. W. Newbould tells me he thinks he met with it some years ago. This season, however, the Rev. W. R. Linton has found it near Perry (where I subsequently saw it) and at Leighton, thus removing the query in 'Topographical Botany.' The Hunts plants are much smaller than those at Sutton, in the Isle of Ely (see 'Journal of Botany,' 1884, p. 28), where this species has reappeared again this summer in great luxuriance and profusion. Referring to the Hunts locality Mr. Newbould writes, "I believe I only just saw a plant or two there, and think the specimens were small ones." Is this always the case with plants of *Bupleurum tenuissimum* growing remote from salt-marshes or tidal rivers; do they become less vigorous as they extend inland?—Alfred Fryer.

Pilaira Cesatii Van T. (p. 300).—I am glad to see that *P. Cesatii* has been discovered by some one else in Britain. It is probably a widely distributed but uncommon species, and needs looking for, but when seen is unmistakable. Mr. Moore does not approve of its separation from *Pilobolus*, but possibly he will discover, if he will read the conclusion of my monograph of the *Pilobolidæ*, that the reasons for so doing are, to an evolutionist, convincing.—W. B. Grove.

Dorset Plants.—The two following plants, new records for Dorset, were found by me this month in the bed of the Winterbourne Stream at Came, about two miles from Dorchester, viz., *Thalictrum riparium* Jord. and *Polygonum maculatum* Trim. & Dyer, the latter in some abundance, associated with *P. lapathifolium* L. (which is rare in South Dorset), and *Chenopodium acutifolium* Sm.—W. Bowles Barrett.

NOTICES OF BOOKS.

A Synopsis of British Mosses. By C. P. Hobkirk. Ed. 2. pp. viii. 240. Reeve & Co. 1884.

A second edition of this little book speaks well for its popularity among students of Bryology, and extends to forty-four pages beyond its predecessor.

The difficulty of describing so extensive and intricate a group as that of the Mosses, in a manner sufficiently popular to interest the student, and yet with sufficient clearness to guide him to a correct determination of the specimens before him, is very great; and although our author has availed himself of the writings of all the great authorities, we do not feel certain that the feat has yet been accomplished, principally because an equal value is assigned to all the characters referring to the species, so that the essential cannot be distinguished from those that are common or general. The arrangement of the families is different from that in the first edition, being founded on that enunciated by Hampe in 'Das Moosbild' (1871), the main divisions of which—*Saccomitria* and *Stegomitria*—depend solely on the form of the calyptra; and we thus have brought together under the former the three widely divergent groups, *Archidiaceæ*, *Andreæaceæ*, and *Sphagnaceæ*.

The first forty-two pages are devoted to a description of the tribes and genera, following in the plan of the 'Bryologia Europæa,' to which follow the species, well described generally after Schimper's 'Synopsis'; what is wanted, however, is a key or table which will save the student the trouble of wandering aimlessly up and down the book, and direct him straight to the object of his search—the name of the unknown moss before him.

We notice very few errors in the book, but we may indicate that, on p. 48, var. *fimbriatum* should be *imbricatum;* and on p. 78 *Swartzii* should be *Schwarzii;* p. 75, *Dicranum uncinatum* has the fruit both described and figured in the 'Moss-flora'; a tribe, *Georgiaceæ*, also appears, but we do not find any genus *Georgia* to represent it.

The number of species described is 576, being thirteen more than in the first edition; these are not all the British species which have been recorded, and we may notice among the omissions, *Ceratodon conicus*, *Coscinodon Patersoni*, *Bryum Mildeanum*, *B. Muhlenbeckii*, *B. cyclophyllum*, and *Hypnum Lorentzianum*.

Should another edition be called for, we trust the talented author will see his way to improve it in the direction indicated, and thus render it more worthy of its character, as being the best handbook on the subject which has yet appeared. R. B.

We welcome another part (the 8th) of Dr. Braithwaite's 'British Moss-flora,' in which the *Tortulaceæ* are begun. It is not only worthy of its predecessors, but in some respects seems to us even superior to them, the beauty of the plates illustrating *Ephemerum* and *Phascum* being quite unsurpassed. While wishing,

with many others, that the work could proceed more rapidly, we perceive in the amount of work bestowed upon it a reason amply sufficient to account for its comparatively slow progress. Part x. will conclude the *Tortulaceæ*, and also Vol. I. of the work.

New Books. — C. G. Gillet, 'Tableaux analytiques des Hymènomycètes' (8vo, pp. 199: Alençon, Lepage). — C. P. Hobkirk, 'Synopsis of British Mosses,' ed. ii. (8vo, pp. xii. 240: London, Reeve, 7*s.* 6*d.*). — R. Folkard, 'Plant Lore, Legends, and Lyrics' (8vo, pp. xxiv. 611, illustrated: London, Sampson Low & Co., 16*s.*). — S. B. Herrick, 'Wonders of Plant Life' (sm. 4to, pp. 248, 85 figs.: London, W. H. Allen & Co.). — M. Melsheimer, 'Mittelrheinische Flora' (8vo, pp. viii. 164: Leipzig, Henser). — T. Rümpler & C. F. Förster, 'Handbuch der Cacteenkunde,' fasc. i. (8vo, pp. xvi. 64: Leipzig, Kanzler, "1885"). — E. L. de la Chapelle, 'Exposition systematique des Lichens de Cauterets, &c.' (8vo, pp. xx. 133: Paris). — P. Duchartre, 'Éléments de Botanique,' ed. 3 (8vo, pp. viii. 1272, 571 figs.: Paris, Baillière, "1885"). — D. Cauvet, 'Anatomie et Physiologie Végétales' (8vo, pp. viii. 315, 404 figs.: Paris, Baillière, "1885"). — A. Fischer, 'Untersuchungen über das Siebröhrensystem der Cucurbitaceen' (4to, pp. x. 109, tt. 6: Berlin, Boruvaeger).—H. Leitgeb, 'Ueber Bau & Entwicklung der Sporenhäute' (8vo, pp. 112, tt. 3: Graz, Leuschner).—G. Wagener, 'Der Waldbau und seine Fortbildung' (8vo, pp. viii. 579: Stuttgart, Cotta).

Articles in Journals.

American Naturalist. — A. P. Morgan, 'The North American Geasters' (12 figs).—E. A. Southworth, 'Structure, development, and distribution of stomata in *Equisetum arrense*' (1 plate).

Botanical Gazette (Sept.). — L. H. Bailey, 'Notes on *Carex*.' —J. G. Lemmon, *Mimulus Moharensis*, n. sp.

Bot. Centralblatt (Nos. 40–43). — H. Mayr, 'Entstehung und Vertheilung der Secretions-Organe der Fichte und Lärche.'

Bot. Zeitung (Oct. 3, 10).—L. Klein, 'Vergleichende Untersuchungen über Organbildung und Wachsthum am Vegetationspunkt dorsiventraler Farne.'—A. Hansen, 'Ueber das Chlorophyllgrün der Fucaceen.' — M. Reess, 'Ueber die systematische Stellung der Hefepilze.' — (Oct. 17). G. Wiesner, 'Einige neue Thatsachen, welche zur mechanischen Erklärung der spontanen Nutationen und der fixen Lichtlage der Blätter herangezogen werden Können.'

Bull. Torrey Bot. Club (Sept.). — J. H. Redfield, '*Corema Conradii* and its localities.'

Flora (Oct. 1).—K. Goebel, '*Tetramyxa parasitica*' (1 plate).— (Oct. 11). L. Celakovsky, 'Neue Thymi aus Sintensis Iter trojanum (*Thymus pulvinatus*, *T. humillimus*, *T. imbricatus*, *T. Sintenisii*, spp. nn. — (Oct. 21). F. Arnold, 'Die Lichenen des fränkischen Jura.'

Gardeners' Chronicle (Oct. 4).— *Clerodendron illustre*, N. E. Br., *Piper ornatum*, N. E. Br., spp. nn.; Berries of *Garrya elliptica* (fig. 75); Garden Palms; W. G. Smith, 'Disease in Palms' (*Pestalozzia phœnicis* Vize), figs. 76–78; *Polypodium vulgare* var. *trichomanoides* (fig. 79).—(Oct. 11). *Abies Webbiana* (fig. 86).—Oct. 18). *Scilla Bellii* Baker, n. sp.; *Parrotia persica* (figs. 89, 90).—(Oct. 25). *Dendrobium virgineum* Rchb. f., n. sp.; J. G. Baker, 'Notes on cultivated Asters.'

Journal of Royal Microscopical Society.—J. H. L. Flögel, 'Researches on Structure of cell-walls of Diatoms' (tt. 9–11).

Knowledge (Oct. 3).—Grant Allen, 'Grass of Parnassus.'

Magyar Növénytani Lapok (Oct.).—Memoir of Bentham.—L. Simkovics, '*Asperula strictissima* Schur! *A. rubioides* Schur! és Erdély florájának Galium-fajai.'

Midland Naturalist.—W. H. Wilkinson, *Ricasolia amplissima* (1 plate).—H. P. Reader, '*Lunularia vulgaris*.'—W. B. Grove 'On the Pilobolidæ' (cont.).—J. E. Bagnall, 'Flora of Warwickshire' (cont.: *Orchideæ—Liliaceæ*).

Nature.—(Oct. 2). Memoir of George Bentham.

Nuovo Giorn. Bot. Ital.—L. Nicotra, 'Elementi statistici della flora siciliana.'—L. Macchiati, 'Catalogo di pronubi delle piante.' R. Pirotta, 'Breve notizia sul *Cystopus capparidis*.'

Œsterr. Bot. Zeitschrift.—J. L. Holuby, 'Trentschiner Flechten.'—A. Hausgirg, 'Süsswasseralgen.'—B. Blocki, 'Zur Flora von Galizien.'—E. Formánek, 'Flora der Beskiden' (cont.).—J. Ullepitsch, Memoir of Anton Rochel (b. 18 June, 1770, d. 12 March, 1847).—P. G. Strobl, 'Flora des Etna' (cont.).

Pharmaceutical Journal (Oct. 18).—W. T. T. Dyer, 'Collection of Gum Labdanum in Crete.'—(Oct. 25). J. Moeller, 'Chaulmoogra Seed.'

Scottish Naturalist.—J. W. H. Trail, 'Two new British Ustilagineæ' (*Entorrhiza cypericola* and *Melanotænium endogenum*).—Id., 'Casuals and introduced plants in N.E. Scotland.'—G. C. Druce, 'Botanical Work of G. Don' (concl.).—J. Keith, 'Fungi of Moray.'

BOTANICAL NEWS.

We learn that it is proposed to place some memorial of Mr. Bentham in the Herbarium at Kew, the scene of his botanical labours. Such a project cannot fail to receive the support of botanists, and we are glad that they will have an opportunity of contributing to it. A Committee will, we believe, be formed at once for carrying out the scheme; meanwhile those desiring to contribute may communicate with Dr. Masters, F.R.S., 44, Wellington Street, Strand, W.C., or with the Editor of this Journal, 18, West Square, Southwark, S.E.

THE LATE GEORGE BENTHAM, F.R.S.

By B. D. Jackson, Sec. L.S.

(With Portrait).

The news of the death of Mr. George Bentham, F.R.S., briefly communicated in the 'Journal of Botany,' for October last, page 304, demands a longer notice than was possible immediately after his decease. The short account which we here present to our readers has been drawn up from recently published material, and from memory of conversations, extending over some years, with the deceased botanist.

George Bentham was born at Stoke, in Hampshire, a village near Portsmouth, on September 22nd, 1800, the Coronation Day of George III., so that he was accustomed to say that when he was a boy, a royal salute used to be fired on his birthday. He was the second son of General (afterwards Sir Samuel) Bentham, and the eldest daughter of Dr. George Fordyce. In 1805 General Bentham was sent by the English Government to St. Petersburg, where the family resided until 1807; here George acquired his knowledge of the Russian and Scandinavian languages.

War breaking out in 1807 between Russia and England, General Bentham was recalled, and on his return the family settled at Hampstead; the education of the younger members being continued under private tutors, the subject of our notice never attended a school of any kind. On the peace which followed the banishment of Napoleon Bonaparte to Elba, the Benthams removed to France, and took up their residence first at Tours, then at Saumur and Paris, their residence at the latter place extending over the exciting times of the hundred days. After this the family moved southward, travelling leisurely from one place to another in the southern provinces of France.

Whilst in this part of France, Bentham's attention was first turned to botany, by his mother possessing a copy of DeCandolle's 'Flore française,' and George taking it up accidentally, was struck with the dichotomous tables for the determination of the plants, a plan which at once commended itself to his methodical mind. Gathering the first plant he saw, he tried to run it down by the aid of the book, and was long hindered by the articulation of the stamens of his subject, *Salvia pratensis*; but persevering, he succeeding in determining it, and his success induced him to prosecute the study.

At Montauban Mr. Bentham spent many months, afterwards looking back upon them as the happiest period of his life; he was entered as student of Faculté de Theologie at Tours, near by, and his time out of college was given up to drawing, botany, and music; he attended thirty-four balls between Twelfth-night and Shrove Tuesday, thirteen of which were consecutive, lasting from nine at night to the same hour the next day.

During the next few years his life was very varied in its functions. He studied exotic plants, and insects, besides philosophy with John Stuart Mill, then a guest of his father for some months; he was his father's farm manager of an estate of 2000 acres, near Montpellier, his elder brother having lost his life by an accident some years before. Under his close methodical application the farms and vineyards rapidly improved, and were very profitable, but he did not neglect his botany, for he found time for herborizations in the Pyrenees and the Cevennes, and spare hours were given to translating his uncle Jeremy Bentham's Chrestomathia into French.

He visited England in 1823 to buy agricultural implements, and to inquire how further improvements might be effected in his Montpellier estate. But on his return he was hindered from doing all he wished by provincial jealousy, which led finally to the relinquishing of the estate in 1826, and the return of the family to England. Soon after his arrival in this country he took a tour through England and Scotland, taking letters of introduction to the leading botanists. In the same year he brought out his 'Catalogue des plantes indigènes des Pyrenées.'

Jeremy Bentham, his uncle, now opened up a new career to him, inviting him to devote some of his time in arranging MS. for the press, assuring him that he would make provision for him on his death. This plan was only partially acceptable to George Bentham, who wished to embark on some profession which would render him independent of his relatives. After much consultation, it was arranged that he should enter Lincolns Inn and read for the bar, whilst giving some hours each morning to his uncle's work, and again in the evening. This arrangement lasted until Jeremy's death in 1832, when George Bentham found himself master of a house in Queen-square Place, but with less property than was expected, arising from various circumstances; but his father's death in the previous year made this of comparatively small importance. During these six years his life was one of incessant mental activity. Besides the work he accomplished for his uncle, he edited and partly rewrote his father's papers on naval administration.

In 1827 he published his "Outlines of a new System of Logic," with a criticism of Dr. Whateley's Elements, in which the doctrine of the quantification of the predicate is for the first time set forth; only a few copies of this work were disposed of, when the publishers' failed, and the stock was sold as waste paper. Probably it was owing to this that not until 1850 was Bentham's discovery recognised in the 'Athenæum' for December 31st, and a dispute as to Sir William Hamilton's claims to the same was raised, but has been adjudicated in favour of Bentham.

In 1826 he was elected Fellow of the Linnean Society, and in the following year was proposed by Robert Brown for the Royal Society, but withdrew his candidature in common with several other scientific men, on the election of a President not in accordance with their views.

In 1829 he undertook the Secretaryship of the Royal Horticultural Society, at a period when by excessively wasteful expenditure the Society was reduced to a very low ebb. Being a common friend of Joseph Sabine, the Honorary Secretary, and Dr. John Lindley, the Assistant-Secretary, he took up the burden at their joint solicitation, and only laid it down in 1840, when the Society had been successfully navigated into more prosperous times. It was during this space of time that so many species were introduced by Hartweg, the ill-fated Douglas, and other collectors, and most of the plants raised from their seeds were named and described by Bentham in the Society's publications. The Chiswick fêtes, too, were instituted whilst Mr. Bentham was Secretary, the first being held on April 3rd, 1832, 1700 people being present.

He attended the gathering of *savants* at Hamburgh in 1830, greatly to his delight, as testified by his pleasant recollection of it after the lapse of half a century.

By the publication of his first important botanical work, 'Labiatarum Genera et Species,' 1832—36, he made his mark in the scientific world. The order needed a monographer of Bentham's judicial and philosophical mind for sorting it into methodic arrangement from chaos.

Three years later he married the daughter of Sir Harford Brydges, of Boultibrooke, and the next year removed to his late uncle's house in Queen-square Place, where he resided till 1842, when he left London for Pontrilas House, Herefordshire. Here he continued to work unremittingly upon botany, adding to his herbarium and library, as every naturalist must do if far removed from great centres of scientific industry, until in 1854, when he found that his expenses were increasing beyond his means. He therefore determined to present his collections of plants and books to the Royal Gardens at Kew, and returning himself to London. Shortly after this he took up his quarters at 25, Wilton Place, and resided there until his death.

Henceforward, until the end of last year, he pursued the same quiet method: leaving home a few minutes after nine, he drove to Vauxhall, proceeding thence by rail to Kew, where he worked from ten to nearly four in the afternoon, returning by the same way he came. On his arrival at home he devoted an hour or more to writing out fairly his notes of work done during the day, and then dined. His meals were breakfast and dinner, separated as we have seen by a long interval, and he never broke his fast at other times, nor was he at any time other than a spare eater.

This regular course of life was varied by a two months' holiday in the autumn of each year, in the country or abroad; and each Thursday he devoted to the affairs of the Linnean Society, whilst its President, from 1863 to 1877.

It would be difficult here to give a bibliography of Bentham's published works in full, but we may mention a few of the more important. On settling down to the methodical work at Kew which we have described above, he took in hand the Flora of Hong Kong, the inauguration of the Colonial Floras, which have from time to time

been issued under the auspices of the authorities at Kew. That finished, he undertook and completed the description of the plants of the most extensive local exotic flora ever undertaken, that of Australia; in which he derived great assistance from the plants and accompanying notes of the Government Botanist, Baron Ferd. von Mueller. The main work of his life was done in conjunction with Dr. (now Sir Joseph) Hooker, being a revision, *after examination*, of the known genera of phanerogams. Begun in 1860, the first part was issued in 1862, and finally brought to a conclusion in 1883. Immediately after the conclusion of this great work, his health visibly declined, and after a few months of decreasing strength he died at his house in Wilton Place on 20th September last.

In 1861 he was elected President of the Linnean Society in succession to Prof. Bell, and for thirteen years he devoted much time to the routine duties of his post, taking on his own shoulders some of the labour properly belonging to the other officers of the Society. His purse was constantly opened for the purposes of the Society, and his series of anniversary addresses, which were in turn looked forward to by the body of Fellows as a most important factor in the day's proceedings. His last published paper came out in the Society's Journal, detailing the respective amount of work contributed by Sir J. D. Hooker and himself to the 'Genera Plantarum,' and upon his death he was found to have bequeathed the sum of one thousand pounds free of legacy duty to the Society, besides other scientific bequests.

The reserve which formed the characteristic soonest observed by those who came into contact with Mr. Bentham, prevented most people from fully understanding the generous nature of the man. The honours which came to him were rather borne by him than coveted.

Dr. Kanitz has prepared an elaborate bibliography, published in 'Magyar Növénytani Lapok' for September and October, but it is worth reminding our readers that extracts from letters sent to Sir William Hooker, relating his doings abroad, were published, as "from an eminent botanist" without the name.* They form in some measure a chapter of autobiography, and are especially interesting when Bentham tells how he has settled down for a winter's work at Vienna, the result of which was his Paper on 'Leguminosæ in the Ann. Wiener Museums.'†

* Hook. Comp. Bot. Mag. ii, 74—78; 187—191. Hook. Journ. Bot. ii. (1840), 103—118. Hook. Lond. Journ. Bot v. (1846), 524—534; vi., 43—54.

† Nature, Oct. 2, 1884, pp. 539—543. Gard. Chron., Sept. 20, 1884, pp. 368—370. Magyar Növénytani Lapok, Sept., Oct., pp. 97—108.

ON *SENECIO SPATHULÆFOLIUS*.

By C. C. Babington, F.R.S.

In Hooker's 'Student's Flora,' ed. 3, this plant is stated not to be the *S. spathulæfolius* of DeCandolle. I am sorry to differ from this authoritative statement, for no reasons are given for it, as my re-examination of the evidence leads me to believe that our plant and that of DeCandolle are identical. It is a plant which varies considerably according to age and possibly situation. The specimens sent to our herbaria from the Continent rarely possess the beautiful radical leaves of the young plants. These leaves seem not to be completely reproduced in successive years, and in all cases are very fugitive. Even Reichenbach does not show them in their beauty on his admirable plate (Iconog. f. 240) quoted by DeCandolle. He says in the text (Cent. ii., p. 15), that Koch's description of the plant (Fl. Bot. Zeit. 1823, p. 515) is admirable. That description I have not seen, but in his Fl. Germ. et Helv. (ed. 1, 384, and ed. 2, 424), he gives a very good description of our plant, and quotes Reichenbach as above, and Sturm (heft 40, f. 14, where it bears the name of *Cineraria longifolia* Jacq., but in the index published by Sturm in 1839 it is called *C. spathulæfolia* Gm.). This plate of Sturm I have no doubt represents our plant, and it is quoted by DeCandolle to his *S. spathulæfolius* (Prodr. vi., 362). DeCandolle's specimens also were sent to him by Koch. The figure published by Reichenbach fil. (Icon. Fl. Germ., xvi., t. 978, I.), is not nearly so good as that given by his father in the 'Iconographia' (t. 126, f. 240).

The remarkable radical leaves are remaining, more or less completely, on specimens now before me from F. Schultz (Herb. Normale, 690), and Wirtgen (Fl. Critica, 609), and from C. H. Schultz. They are all named *S. spathulæfolius*, and are quite like the specimens from Holyhead. These latter I have studied carefully in cultivation from seed, side by side with seedings of the *S. campestris* of our chalk hills. The two plants seem to me to be always quite distinct. We also received at our botanic garden, a living plant named *S. spathulæfolius*, from Mr. Leichtlin, of Baden, which flowered there and then died. It appeared to me to be exactly the same as the plant from Holyhead.

Koch and Nyman consider the *S. spathulæfolius* of DeCandolle to be the *C. lanceolata* of Lamarck (Fl. Fr. ii., 125), but DeCandolle nowhere quotes that name, not even in his Syn. Pl. Gall., published in the name of Lamarck and himself. As we, however, refer our plant to *Senecio*, there is no question of the priority of DeCandolle's name. If the plant is placed in the genus *Cineraria*, and it is indeed the same as that of Lamarck, then its name will be *C. lanceolata* Lam., as it is in Nyman (p. 352). But I trust that DeCandolle is correct in neglecting that name of Lamarck, as a less applicable one could not easily be found.

I hope that I have now shown good reason for retaining the name of *S. spathulæfolius* for our plant, and that it is identical with that so named by DeCandolle.

What appears to be our plant has been sent to Mr. Backhouse from the Continent as *C. capitata*. But the *C. capitata* (Wahl.), is *S. aurantiacus* β. of Reichenbach (Iconog., t. cxxviii., figs. 243 and 244), which is quoted by Reichenbach fil. as *S. aurantiacus*, and is apparently different from that sent to Mr. Backhouse. This *C. capitata* appears to be only a rayless state of *C. aurantiaca*, as it is understood to be by most, if not all authors. It has the "flores rubro-aurantiaci" of *C. aurantiaca*, but not usually the radiant florets.

C. capitata of Hoppe is a rayless form of *C. pratensis* (Hoppe). It is figured by Reichenbach (Iconog. t. cix., f. 219). I have a specimen from Reichenbach before me, and it is quite different from the specimen sent to Mr. Backhouse, and from the Welsh plant.

I am greatly indebted to Mr. Backhouse for allowing me to examine the specimen sent to him.

ON *CYPERUS BULBOSUS* VAHL.—THE "SILANDI ARISI" OF S. MADRAS AND CEYLON.

By HENRY TRIMEN, M.B., F.L.S.

THE useful revision of Indian species of *Cyperus* recently published by Mr. C. B. Clarke * has, amongst other things, brought again into prominence a distinct and interesting little species formerly well known, but, from having had the ill-luck to become confounded with others, recently much lost sight of. This is fully described in the monograph referred to as *C. jeminicus* Rottb.† and affords the "Silandi" or Chilandi arisi," a well-known food of the Tamils of the southernmost part of the Madras Peninsula and of North Ceylon. The following notes were partly written out more than two years ago, when sending Ceylon specimens of this *Cyperus* to the herbaria of the British Museum and Kew, but are now re-written in the light of Mr. Clarke's paper.

Whether this plant is Rottböll's *C. jeminicus* is doubtful. That species was described and figured in 1786,‡ from specimens collected by Forskål in Yemen, Arabia (whence the specific name), and neither description nor figure agree well with the plant under consideration. In the same year Retzius § referred to Rottböll's species specimens collected by Koenig "in graminosis Zeylonæ," but he remarks that Rottböll's definition is not a correct one for the plant, and amends it. Koenig § noted that in Ceylon the

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* Journ. Linn. Soc. xxx. pp. 1—202.

† *L. c.*, p. 175.

‡ Descript. & Ill. Pl., p. 25, tab. viii. fig. 1.

§ Obs. Bot. iv., p. 11.

‖ Koenig visited Ceylon in the early part of 1781.

bulbs were eaten by the natives; and his specimen in the British Museum Herbarium leaves no doubt as to its identity with the "Silandi arisi." That Tamil name is not however mentioned by him; but it is given, as "Sheelandéi Arisee," in Ainslie's excellent 'Materia Medica of Hindostan' (1813).* The name of the species is there recorded as "*Cyperus geminatus*, sp. nov.," and the following information is given about it:—"This was first brought to the notice of Europeans by the late Dr. James Anderson, who, in an excursion he made to the southern part of the peninsula some years ago, discovered that the "Sheelandéi Arisee," from growing in sandy situations by the sea-side and requiring but little water, was the common food of the natives during famine and when other grains are scarce. It is nutritious, pleasant to the taste, and makes a pudding somewhat resembling that made of sago. Dr. Anderson, with that kindness and benevolence which ever distinguished him, disseminated the bulbous roots of this curious plant wherever he thought, from their particular qualities, they would be beneficial."

The botanical determinations in this book are, as is well known, due to Dr. Rottler; and the name *C. geminatus* appears on the labels to the specimens of this plant in his herbarium (now at Kew) thus:—"*C. geminatus*, Schreber in litteris,†" with a short MS. description, showing the specific name to be derived from the spikelets "sæpius geminatis." Another specimen is labelled "Chilandi Arisi of Dr. Anderson," and the information added, "Ad radices profert grana tuberosa edulia Silendi arisi dicta." Though Schreber's name was never published with a description, it occurs in Moon's 'Catalogue of Ceylon Plants,'‡ and the specimen (Hb. Kew) of Wallich, No. 3317 B is labelled "*C. geminatus*, Hb. Madr."

Before this, Vahl, in 1806,§ published his *C. bulbosus*, with a very full description, which undoubtedly refers to our plant. He considers *C. jeminicus* Rottb., an entirely different species'‖ and has some critical observations on it, apparently made from actual examination of the typical specimens of Forskål. He adds that *C. jeminicus* of Retzius, is no doubt a different plant from Rottböll's, but he was clearly not aware that it was his own *C. bulbosus*. For this latter he gives as localities "Senegal, Guinea and India Orient.; Jussieu, Thonning and König."

In 1839 another and very appropriate name was bestowed¶ on the species: *C. bulbiferus* "Retz." Dietrich does not say whence he obtained this name of Retzius. It is probable that, subsequently to his remarks in "Observ." iv., already referred to, Retzius determined (as Vahl afterwards), that König's Ceylon plant was

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* P. 250.

† *C. geminatus* Schrader, is a very different Brazilian species.

‡ P. 6.

§ Enum. Plant. ii., p. 342.

‖ *l. c.*, p, 325.

¶ Dietrich, Syn. Plant, i., p. 222.

different from the Arabian one of Rottböll, and gave it another name; but it does not appear to have been published before Dietrich's book.

Vahl's name, *C. bulbosus*, thus has priority, and is that adopted by Nees * (who remarks that *C. jemenicus* Rottb., is altogether different), and by Böckeler in his monograph.† It should however be remarked that *C. jemenicus* of Roxburgh ‡ is no doubt the plant of Retzius and Vahl, though his description does not quite agree in all particulars. He describes the little bulbs and their use as food (they are called in Telinga (= Telugu) "Puri-dumpa"—the plant being "Puri-gaddi"), and says that the plant grows in sandy pasture ground near the sea; he does not state in what part of India he had met with it, but it may be presumed to have been the north part of the Coromandel coast.§

Kunth appears to have quite overlooked the species, and merely gives || Vahl's name as a synonym of the very common and variable *C. rotundus* L. He has been followed by many other writers, including Thwaites.¶ Hochstetter (Pl. Schimp. No. 580), proposed the name *Hemichlæna bulbosa* for a depauperate variety of this plant with erect spikelets.**

Clarke places *C. bulbosus* (*C. jemenicus*) in the typical series of his section "Corymbosi," principally characterized by being leafy plants with a perennial (usually creeping) rhizome; on the one side its neighbours are *C. tenuiflorus* Rottb., *C. stoloniferus* Retz., *C. rotundus* L., and *C. longus* L.; and on the other the African *C. usitatus* Burch., *C. Thomsoni* Boeck. and *C. esculentus* L. I do not greatly object to this position for *C. bulbosus* Vahl, but it is to be remarked that its mode of growth is entirely different from all these allied species; as this does not appear to have been quite understood by Mr. Clarke, I may be permitted to make a few remarks on the subject.

Each individual of *C. bulbosus* is as strictly an annual as other proliferous bulbous plants, such as many Alliums, of which it has completely the structure. It is often customary to term such plants "perennial," as they are able to carry on their existence from year to year without production of seed; but it should be understood that at no time of its life does *C. bulbosus* acquire any sort of permanent rhizome, either erect or creeping, as is the case with all its allies. At the flowering season the small ovoid bulb consists of the very short stem (giving origin beneath to a copious tuft of long roots and above to the perfectly leafless scape) bearing several light brown papery short scales, outside of which are three

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* In Wight, Contrib., p. 80.

† Linnæa xxxvi., p. 300, n. 238.

‡ Fl. Ind. i., p. 191.

§ I do not, however, find the name "Puri-gaddi" nor the plant mentioned in Elliott's 'Flora Andhrica.'

|| Enum. Plant. ii., p. 58.

¶ Enum. Pl. Zeyl., p. 343.

** A. Richard, Fl. Abyss. ii., 509.

or four very hard stiff distichous striated black ones, polished internally and terminating in bristly points. Within the short scales arise the five or six leaves which form very thin and papery sheaths round the scape from one to two inches of its length, and terminate in spreading blades. In the axils of the scales originate the little bulbils which are the edible part of the plant; these may be sessile there, but much more often terminate very slender but tough flagelliform thread-like stolons, which are three or four inches long and often numerous from the scale-axils. I am quite at a loss to guess what is intended by Mr. Clarke's figures,* which are said to represent the rhizome of *C. jemenicus*, and are described at page 4 of his paper. The size of the bulbils is pretty uniform, about three-eighths of an inch long, and their structure somewhat like that of the parent, with two or three external hairs or blank papery scales; the inner ones, however, are thick, white, crisp and fleshy, forming a solid sweet edible kernel. The propagation of the plant is effected by the stalked bulbils rooting in the sand and setting up for themselves. This mode of propagation is altogether different from any other Indian species of *Cyperus*.

The plant is very abundant in the dry sandy coast districts of Ceylon, especially at Manaar, Putlam, Chilaw, &c., on the north-west coast; it is also common in the curiously similar outlying arid district of Hambantota, on the south-east coast of the island, but is not found in the moist regions. Out of Ceylon its distribution is that of a typical member of the desert flora of the Old World, extending as it does from Cape Verd, across North and Central Africa to Abyssinia, Arabia, Beluchistan, Scinde, and the Coromandel Coast.

The preparation of the "Silandi Arisi" for food in Ceylon is simple enough. The bulbils are separated from the sand by a sieve, and are afterwards parched or roasted over a fire, the outer black scales being removed by gentle pounding in the native mortar. They are eaten in this state, or more often made into flour by soaking them for three hours and then pounding; for the flour small cakes or puddings are prepared. There is no aromatic flavour in these little starchy bulbils, as in the tubers of *C. rotundus*.

From this latter abundant and pestilent weed, with its branched tuberous rhizome, there can be no difficulty in distinguishing *C. bulbosus*, even in the herbarium, by the inflorescence alone. This in *C. bulbosus* is never umbellate, but always paniculately racemose, with the terminal spikelets well above those of the lower branchlets, which are rarely elongated, the outline of the inflorescence being globular-ovoid, with the divaricate sessile spikelets usually in pairs.

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* *L.c.*, t. ii., figs. 17, 18.

FERNS COLLECTED IN COSTA RICA BY MR. P. G. HARRISON.

By J. G. Baker, F.R.S.

The following is a list of the species contained in a collection of ferns made recently amongst the mountains of the interior of Costa Rica, at an elevation above sea-level of from 1000 to 5000 feet, by Mr. P. G. Harrison, who is now on a visit to this country. As so little is known about the botany of that region, it is to be hoped that he will carry forward his explorations. The numbers prefixed to the novelties indicate their position according to sequence in our 'Synopsis Filicum.'

Gleichenia pubescens, H. B. K.—*G. revoluta*, H. B. K.

Dicksonia rubiginosa Kaulf.

Adiantum concinnum, H.B.K.—*A. macrophyllum* Sw.—*A. Kaulfussii* Kunze.—*A. tetraphyllum* Willd.—*A. intermedium* Sw. A variety with simply pinnate fronds.—*A. patens* Willd.

Pteris aculeata Sw.

Pellæa intramarginalis J. Sm.

Blechnum gracile Kaulf.—*B. unilaterale* Willd.—*B. occidentale* L.

Asplenium rhizophornm L. All the three varieties as defined in 'Synopsis Filicum.'—*A. cultrifolium* L.—*A. pumilum* Sw.—*A. bissectum* Sw.—*A. formosum* Willd.—*A. furcatum* Thunb.—*A.* (*Diplazium*) *sylvaticum* Presl.—*A.* (*Diplazium*) *Shepherdi* Spreng.—*A.* (*Diplazium*) *arboreum* Willd.—*A.* (*Diplazium*) *costale* Sw.

205*A. (Diplazium) **Harrisoni** Baker, n. sp.—Rootstock not seen. Stipe slender, naked, greenish brown, 3 in. or more long. Lamina oblong-lanceolate, simply pinnate, moderately firm in texture, green and glabrous on both surfaces, not decrescent at the base, 6–8 in. long, 2–2½ in. broad. Pinnæ 15–18-jugate below the pinnatifid apex of the frond, all sessile, oblong-lanceolate, obtuse or subacute, subentire, the lower 1–1¼ in. long, ¼–⅓ in. broad, unequal at the base, cut away on the lower side, auricled on the upper. Lower veins of the pinnæ forked; upper simple, erecto-patent, sori reaching nearly from midrib to edge of the pinnæ, the lower diplazioid. Indusium broad, firm, glabrous, persistent. Nearest the Malayan *A. pallidum* Blume.

206.*A. (Diplazium) **macrotis** Baker, n. sp.—Rootstock not seen. Stipe naked, greenish brown, 4–6 in. long. Lamina oblong-lanceolate, simply pinnate, bright green on both surfaces, glabrous, moderately firm in texture, 1¼–1½ ft. long. 5–6 in. broad, subdecrescent at the base. Pinnæ 20-jugate below the pinnatifid apex of the frond, all sessile, lanceolate, acuminate, the largest 3–3½ in. long, ½–⅝ in. broad above the dilated base, deeply serrated, especially towards the tip, auricled on both sides at the base, the anterior auricle very large and imbricated over the main rachis of the frond. Veins of the centre of the pinnæ 2–3-furcate, but pinnate in the auricle. Sori falling short a space from the margin, one only to each group of veins, curved, narrow, ¼ in. long, the

lowest diplazioid. Indusium narrow, glabrous, persistent. Allied to the Indian *A. porrectum* Wall, and *A. pinnatifido-pinnatum* Hook.

Aspidium aculeatum Sw., var. *phegopteroideum* Baker. — *A. trifoliatum* Sw.

Nephrodium conterminum Desv.—*N. patulum* Baker.—*N. effusum* Baker.

158**Nephrodium* (Eunephrodium) **stenophyllum** Baker, n. sp.—Rootstock not seen. Stipe slender, naked, greenish, 5–6 in. long. Lamina lanceolate, simply pinnatifid, moderately firm in texture, bright green on both surfaces, hairy on the main veins below, 6–8 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, tapering gradually from the middle to both base and apex, the semicircular marginal lobes $\frac{1}{4}$ in. broad, reaching a third of the way down to the rachis. Veins 6–7-jugate opposite the lobes in the centre of the frond, arcuate, simple, the groups joining towards the margin. Sori small, round, one to each vein, medial on the veins. Involucre minute, hispid, fugacious. Allied to the Guatemalan *N. Skinneri* and the West Indian *N. incisum*.

221**Nephrodium* (Sagenia) **athyrioides** Baker, n. sp. — Stipe slender, fragile, castaneous, naked, 4–6 in. long. Lamina deltoid, moderately firm in texture, bright green and glabrous on both surfaces, 9-12 in. long and broad, with a deeply pinnatifid apex with large lanceolate ascending lobes, and on each side of the castaneous rachis 1–3 petioled free pinnæ, the lowest deeply pinnatifid, especially on the lower side, with several large lanceolate segments. Veins anastomosing copiously in small irregular areolæ with copious free included veinlets. Sori mainly in regular rows on the top of free included veinlets. Indusia small, persistent, varying in shape from round reniform to lunate, as in *Athyrium*. Habit of *Aspidium trifoliatum*, but indusium totally different.

Nephrolepis cordifolia Presl.

80**Polypodium* (Goniopteris) **heterophlebium** Baker. n. sp. —Rootstock and stipe not seen. Lamina oblong-lanceolate, simply pinnate, membranous, bright green on both surfaces, pubescent on the main ribs beneath, 15–18 long, 8–9 in. broad, Pinnæ 8–9 pairs below the pinnatifid apex, all sessile, distant, all except the lowest furnished with a large decurrent base with a rounded auricle at the top; several lower pinnæ 5–6 in. long, 1–1$\frac{1}{4}$ in. broad, acuminate, distinctly crenate. Main veins erecto-patent, distinct, about $\frac{1}{6}$ in. apart. Veinlets short, simple, erecto-patent, sometimes free, sometimes anastomosing at the tip. Sori minute, placed at the tip of the veins, often confluent into an oblong mass when they join. Nearest *P. tetragonum*, but very different by its decurrent pinnæ and the irregularity of their apical anastomosis.

87**Polypodium* (Dictyopteris) **rheosorum** Baker, n. sp. — Stipe naked, castaneous, fragile, $\frac{1}{2}$ ft. long. Lamina deltoid, moderately firm in texture, green, and glabrous on both surfaces, 8–9 in. long and broad, with a deeply pinnatifid deltoid apex with large lanceolate segments, and a single pair of free shortly-petioled pinnæ with short lobes on the upper and larger ones on the lower

sides. Veins anastomosing copiously in hexagonal areolæ with copious free included veinlets. Sori very irregular in size and shape, sometimes of 1–2 sporangia only, sometimes of a globose mass on the top of a free veinlet, but sometimes forming irregular masses on the anastomosing veins. Habit of *Aspidium trifoliatum*.

Polypodium elasticum Rich.—*P. Friedrichsthalianum* Kunze.—*P.* (*Goniopteris*) *loriceum* L. — *P.* (*Goniopteris*) *plesiosorum* Kunze. *P.* (*Phlebodium*) *aureum* L. var.—*P.* (*Campyloneuron*) *lævigatum* Cav. *P.* (*Camploneuron*) *repens* L.—*P.* (*Phymatodes*) *percussum* Cav.

Gymnogramme calomelanos Kaulf. Both the type and var. *chrysophylla*.—*G. tartarea* Desv.

Anemia oblongifolia Sw.—*A. hirsuta* Sw.—*A. Phyllitidis* Sw.

ORCHIDACEAS EPIPHYTICAS BINAS NOVAS

DESCRIBIT HENR. F. HANCE.

2642 **1. Cleisostoma formosanum.** — Foliis carnosis introveniis loratis carinatis apice profunde oblique retusis sinu mucrone parvo munito recurvis 6 poll. longis 10–11 lin. latis, paniculis pedunculo communi folium superanti inferne tereti vaginisque paucis brevibus obtusis appressis prædito superne angulato fultis ramis 4–6 angulatis arcuato-recurvis 2–2½ poll. longis circ. 10–15 floris, bracteolis minutis ovatis acuminatis deciduis, floribus 5 lin. diametro sessilibus, sepalis 2 lin. longis obtusis postico oblongo lateralibus subfalcatis cum petalis oblongis sed angustioribus flavidis fasciis 2 longitudinalibus latis rubenti-fuscis percursis, labelli trilobi lobis lateralibus erectis obtusis intermedio trilobo lobis lateralibus triangulatis patentibus acutis terminali paulo majore obtuso incurvo, calcare horizontaliter producto obtuso 2 lin. longo ore callo parvo elevato cristiformi unisulcato occluso.

Prope Tam-sui, ins. Formosæ, m. Junio 1884, detexit C. Ford. (Herb. propr. n. 22256.)

Maxime affine *C. cerino* Hance.

2. **Ornithochilus eublepharon.*** — Foliis carnosis oblongis acutis introveniis costa subtus parum elevata 6 poll. longis 1½–2¼ poll. latis, floribus in racemos paniculatos digestis, rachi teretiuscula, ramis 3–4 remotis adscendentibus, bracteis ad basin ramorum pedicellorumque ovatis in acumen sphacelatum attenuatis, pedicellis dissitis patentibus 8–9 lin. longis basi articulatis, floribus 9 lin. diametro, sepalis cerinis longitudinaliter sanguineo-striatis 2 lin. longis postico oblongo lateralibus falcatis basi cum labelli ungue in mentum breve connatis, petalis sepalis concoloribus anguste linearibus 1½ lin. longis, labelli ungue lato concavo cerino purpureo-picto marginibus integris subinflexis calcare incurvo conspicuo intus vacuo lamina sanguineo-purpurea postice in carinam triangulatam acutam protrusa necnon juxta os calcaris

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* Χεῖλος est nutrius generis.

pulvinulo ex pilis albis brevibus conflato adaucta antice lunato-biloba cornubus deorsum productis margine pulcherrime ciliato-fimbriata, columna saccata, rostello elongato, polliniis 2 ellipsoideis stipiti loriformi affixis.

In arboribus jugi Lo-fau-shan, prov. Cantonensis, m. Aug. 1883, coll. cl. C. Ford. (Herb. propr. n. 22249.)

Species nostra a charactere Benthamiano columnæ forma recedit; sed, ex mea sententia, recentiores botanici nimio æquius genera jam inter Orchideaceas notis levioris momenti stabiliverunt, nec hæc differentia ad plantam chinensem, aliis quidem notis cum genere cui eam adscripsi bene concordantem, secernendam sufficere censeo. Utriusque plantæ supra descriptæ exemplaria viva florida examinavi.

FOUR NEW CHINESE *CÆSALPINIEÆ*.

By H. F. Hance, Ph.D., F.L.S., &c.

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I. **Cæsalpinia** (Guilandina) **minax.** — Frutescens, diffusa, aculeis rectis uncinatisque armata, ramis foliisque præter novellos primum puberulos glaberrimis, stipulis ad utrumque latus binis (vel, si mavis, unica bipartita) subulatis rigidis, foliis abrupte bipinnatis, pinnis 5-jugis oppositis increscentibus, foliolis 6–10-jugis brevissime petiolulatis oblique ovato-lanceolatis setaceo-apiculatis tenuibus 1–1½ poll. longis 8 lin. latis, racemis multifloris basi paniculatis rachi ferrugineo-tomentosa, bracteis oblongis acuminatis tomentosis pollicaribus 5 lin. latis, pedicellis 8 lin. longis cum calyce pallide ferrugineo-tomentosis, calycis tubo late obconico 3 lin. alto obscure 10-sulcato laciniis oblongis obtusissimis intus glabris 7–8 lin. longis 3 lin. latis infima reliquis paulo longiore, petalis obovatis inferioribus conniventibus margine erosis extus margineque pilis capitatis obsitis albidis 11 lin. longis superiore breviore roseo-purpureo superne arte revoluto, staminum petalis paulo breviorum filamentis inferne dense villosis, ovario dense echinulato, stylo stamina paulo excedente glaberrimo, leguminibus vix stipitatis elliptico-oblongis compressis 7-spermis apice obtuso rostratis aculeis rectis dense armatis 4 poll. longis 1¾ poll. latis, seminibus botuliformibus anthracinis nitentibus 9 lin. longis 4 lin. diametro.

Juxta oppidum Shiu-hing, secus fl. North River, prov. Cantonensis, detexit rev. R. H. Graves. (Herb. propr. n. 22284).

A most interesting plant, remarkable as a singularly distinct member of the small group to which it belongs, differing widely from *C. Bonduc* Roxb.! and *C. Bonducella* Flem.! by its spiniform stipules, very large bracts and flowers, white and purple petals, 7-seeded legumes and the colour and shape of its seeds. I have described it from specimens raised from seeds gathered by Dr. Graves. In the Hongkong Garden it flowers in April, and ripens its fruit in July.

II. **Pterolobium subvestitum.** — Ramulis rachi foliorum

primaria foliolorumque pagina superiore ferrugineo-tomentellis, pinnis 8–9-jugis oblique oblongis apice rotundatis costa in aristulam haud excurrente basi superiore productis saturate viridibus subtus dense ferrugineo-tomentosis $4\frac{1}{2}$ lin. longis sesquilineam latis, racemis amplis paniculatis, pedicellis capillaribus 5 lin. longis, leguminibus . . . . ?

In jugo Lo-fau-shan, prov. Cantonensis, m. Sept. 1883, leg. rev. E. Faber. (Herb. propr. n. 22291.)

This seems to me abundantly distinct as a species from *P. indicum* A. Rich.!, by the much larger number of the leaflets, their greater thickness, darker colour, very marked obliquity at the base, and by their thickly tomentose under surface.

III. **Gymnocladus Williamsii.**—Ramulis foliisque puberulis his simpliciter abrupte pinnatis 4-jugis petiolo seta trilineali determinato, foliolis suboppositis tenuibus oblique oblongis setaceo-acuminatis basi obtusis inæqualiter crenatis tenuiter reticulatis venulis parum prominulis brevissime petiolulatis, racemis axillaribus folio æquilongis laxe multifloris, floribus pedicellis filiformibus 2-linealibus suffultis, calycis tubo infundibulari 2-lineari laciniis subulatis æquilongis cum pedicellis puberulis, petalis oblongis utrinque tomentosis calycis segmenta paulo superantibus, staminibus corolla paulo longioribus filamentis glaberrimis.

In montosis Pekinensibus, m. Junio, 1865, coll. beatus Dr. S. W. Williams, illustris sinologus, cui pio animo insignem hanc plantam dedico. (Herb. propr. n. 12557.)

I have only male specimens of this plant, which, by the texture and size of the leaflets and the elongated racemes, is much more nearly allied to *G. canadensis* Linn.! than to *G. chinensis* Baill.!, which latter I only possess in fruit. I appropriately inscribe this, the second Chinese member of a genus of which until a few years ago but one species, and that North American, was known, to the late distinguished scholar and most excellent man from whom I received my specimens, and whose own Japanese collections, made many years ago, contributed so largely to demonstrate the close relationship between the Atlantic-American and East-Asiatic Floras.

IV. **Gleditschia xylocarpa.**—Glaberrima, spinis robustis compositis conicis armata, foliis abrupte pinnatis 3–4-jugis, foliolis suboppositis coriaceis ovato-lanceolatis obtusis crenatis dense reticulato-venulosis venulis prominentibus brevissime petiolulatis, gemmis axillaribus binis ternisve superpositis, leguminibus lignosis rigidis oblongis rectis plano-compressis apice acutis apiculatis basi sensim in stipitem longiusculum attenuatis 9 poll. longis $1\frac{1}{2}$ poll. latis, seminibus pluribus haud prominulis.

In collibus agri Shanghaiensis, m. Octobri, 1881, coll. T. L. Bullock. (Herb. propr. n. 22252.)

I have not seen the flowers of this, but it is evidently quite distinct from *G. sinensis* Lam.!, by the far closer and more prominent reticulation of the leaflets, and by the much greater size and extremely woody texture of the legume, which is in no way torulose from the pressure of the seeds on the valves, and is gradually attenuated from a distinct seedless base into a long stalk.

ADDITIONS TO THE RECORDED FLORA OF SKYE.

By the Revs. W. R. Linton, M.A., and E. F. Linton, M.A.

The following is one result of a week's work in the Island of Skye (District 104, "North Ebudes"), at the beginning of August this year; and judging from what we saw and what we left undone, we are inclined to think that there is still much room for further discoveries, especially in some of the less frequented parts of the Island. The locality has usually been given, where the species was only seen in one place. As a safeguard against error, questionable plants were submitted to Mr. Arthur Bennett.

Raphanus Raphanistrum L.

Cochlearia officinalis L. Both forms, *C. littoralis* and *C. alpina* were observed; the aggregate has been recorded before.

Viola tricolor L. Here, again, the aggregate has been recorded. We gathered both *V. arvensis* and *V. tricolor*, the latter rather plentiful near Uig.—*V. lutea* Huds., var. *amœna*. This occupied some waste ground, formerly washed by a stream.

Drosera obovata M. & K. This is no new record, having been observed, I believe, by Professor Lawson: but it is not mentioned for 104 in the 'Topographical Botany.' We gathered it in boggy ground near the river Sligachan, where it grew in about equal quantities with *D. anglica* Huds.; *D. rotundifolia* L., was also present, but noticeably much less frequent.

Polygala depressa Wender. Not very common.

Cerastium alpinum L. var. *pubescens*. Cuchullin Hills. The aggregate has been recorded before. We saw none of the usual form *C. lanatum*.

Spergularia neglecta Syme, E. B. Shore of bay, Uig.—*S. marginata* Syme, E. B. Shore of bay, Uig.

Acer Pseudo-platanus L. Introduced.

Trifolium hybridum L., and *T. procumbens* L. Waste ground, Uig.

Agrimonia Eupatoria L. Near Portree.

Rubus corylifolius Sm. Uig. We saw one other form at Uig, which looked like var. *conjungens*; and another single bush, near Portree, which might have been *R. Lindleianus*, or possibly *R. affinis* W. & N. These were the only fruticose Rubi noticed.

Rosa mollissima Willd.—*R. dumalis* Bechst. Near Portree. *R. subcristata* Baker. Near Uig.

Saxifraga sponhemica Gmel. In small quantity, with *S. hypnoides* L., growing near, at the base of the higher rocks at the Quiraing. (Mr. A. Bennett agrees to this naming).

Scabiosa Succisa L. Very common all along the valley of the Sligachan.

Petasites vulgaris Desf. Waste ground, Uig.

Carduus palustris L. Frequent near Uig.

Gnaphalium sylvaticum L.—*G. supinum* L. Scarce; on the Cuchullin Hills, at 2600 ft.

Solidago. Virga-aurea L., var. *angustifolia*, and var. *cambrica*.

All three forms appeared to be represented; but var. *angustifolia* was most frequent.

Leontodon autumnalis L., var. *pratensis*. Frequent between Uig and the Quiraing; the variety more plentiful than the type, which has been already recorded.

Taraxacum officinale Wigg., var. *palustre*. The Quiraing.

Hieracium anglicum, Fries. The Quiraing.—*H. anglicum*, var. *acutifolium*. Stony ground near stream, Uig.—*H. iricum* Fries. Rocky stream, Sligachan. —*H. pallidum* Fries. Uig and the Quiraing.—*H. crocatum* Fries. Near Uig. (Two other *Hieracia* were found and taken to be *H. cæsium* and *H. gothicum*; but as Mr. A. Bennett was not able to agree in the naming of these two, they are referred to Mr. J. Backhouse.)

Fraxinus excelsior L. Seemed introduced.

Mimulus luteus L. Well-established in a wet piece of grassy ground, Broadford.

Veronica agrestis L. Doubtfully native.

Thymus Chamædrys Fries. On steep sloping banks north of Uig Bay, in company with *Orobanche rubra* Sm., which grew plentifully upon it this summer.

Galeopsis versicolor Curt. In a cultivated field, Broadford.

Myosotis repens Don. Sligachan.—*M. versicolor* Reich.

Plantago Coronopus L.

Chenopodium album L, Uig.

Salicornia herbacea L.

Polygonum Convolvulus L. Waste ground, Uig.—*P. aviculare* var. *littorale*. Uig.

Fagus sylvatica L. Obviously introduced.

Populus nigra L. Obviously introduced. N.B. *P. tremula* L. seemed quite at home, never rising into a tree, but growing as a shrub, a dwarf tree, out of the rocky sides of streams near Sligachan.

Salix alba L., and *S. viminalis* L. Both introduced.—*S. cinerea* L. Sligachan.—*S. laurina* Sm. Near Portree.—*S. phylicifolia* L. Moorland near Sligachan; no fruit.

Sparganium affine Schneiz. Peaty pool, between Uig and the Quiraing.

Orchis mascula L. Rocky ledge, Quiraing.

Habenaria bifolia Bab. Man. Sligachan; only one plant seen.

Listera ovata Brown. A few plants, high up on a grassy cliff near Uig.

Luzula multiflora Koch., and b. *congesta*. Both near Sligachan.

Juncus lamprocarpus Ehrh. Sligachan.—*J. Kochii* Bab. Peaty edge of small pool, Uig to Quiraing.—*J. bufonius* L.—*J. squarrosus* L.

Scirpus uniglumis Link. Uig and the Quiraing.—*S. pauciflorus* Lightf. Uig.—*S. setaceus* L.

Eriophorum vaginatum L. Sligachan.

Carex limosa L. (proper). Bog by River Sligachan. The aggregate was recorded.—*C. præcox* Jacq. Scanty supply seen, near Uig.—*C. fulva* Good. Near Sligachan Hotel.—*C. flava* L. Sligachan.

Avena pubescens L. Uig to Quiraing.

Agrostis vulgaris With var. *pumila*. Grassy slopes of the Quiraing.

Poa alpina L. A small quantity was found on the Cuchullin Hills, alt. 27080—2800 ft.—*P. nemoralis*, var. *glaucantha* Reich. Mr. Bennett so names this grass.

Festuca ovina L., var. *glauca*. In some quantity near Uig tinging the bank by the bay where it grew with its glaucous hue.—*F. ovina* L., var. *major*. The Quiraing.

Woodsia hyperborea Brown. Base of the highest rocks at the Quiraing. Only one little plant seen; but this may be taken as proof that more grew (as it usually does) on the precipice above.

Nephrodium Filix-mas, var. *Borreri*. Also gathered near Strome Ferry. (Ross West).

Equisetum limosum, b. *fluviatile*, near Quiraing.

Chara fœtida Braun., var. Broadford, in a pool near the sea. This Mr. A. Bennett considers to be form *longifolia longibracteata*, and speaks of it as peculiar in having many of the branchlets ecorticate.

Nitella opaca Ag. Growing in a little loch, below the rocks of the Quiraing; and also in a moorland pool of very small dimensions between Uig and the Quiraing, on the watershed. In the latter case we should have been uncertain about its identity, without Mr. A. Bennett's opinion on it, on account of its straggling growth. The plant has the general appearance of the variety *attenuata* H. & J. Groves.

DESCRIPTIO NOVI GENERIS RUBIACEARUM

A Rev. B. Scortechini, F.L.S.

Creaghia, n. g.—(Ord. Rubiaceæ. Trib. Cinchoneæ. Subord. Hillieæ).—Calycis tubus obconicus compressus; limbus 4–5 partibus, caducus, lobo uno post anthesin in laminam foliaceam producto. Corollæ lobi 4–5 ad basim partiti, apice imbricati, breviter contorti, demum reflexi. Stamina 4–3, filamentis in alabastro supra stigma armatis, flore expanso reflexis, antheris bilocularibus basi partitis, versatilibus, post anthesin recurvis. Discus latus leviter convexus, medio cavus. Ovarium 2-loculare; stylus brevis, stigmatio apice 2-partito, lobo uno majore in minorem reclinante; ovula numerosa placentis eminentibus septo peltatim adfuscis inserta, imbricata, ascendentia. Capsula . . . . . Semina ala tenui venulosa circumdata. Arbor haud elata ramulis teretibus. Folia opposita. Stipulæ ellipticæ deciduæ, in alabastro coalitæ. Flores in paniculis latis axillaribus dispositi, pedicellati, ebracteolati, ramulis paniculæ compressis.

Genus quod inter omnia *Calycophyllo* DC. maxime accedit, ab ipso insigniter distinguitur corollæ lobo nullo exteriore, lobis omnibus fere ad basin partitis, filamentis basi corollæ fixis, calycis

limbo partito, inflorescentia axillari, patria. Majori distantia recedit ab omnibus aliis congeneribus ejusdem subtribus. Nomen *Creaghiæ* huic generi indidi ab illustri viro C. V. Creagh, qui dum botanicam rem studiose fovet, de ea bene meretur.

C. fagræaopsis. — Arbor facie *Fagrææ*, glabra, excepta minuta lanugine calycis ac petalorum, usque ad 40 p. alta, foliis late obovatis emarginatis coriaceis, integerrimis 8–10″ longis, 6″ latis, petiolo robusto 1″ longo, superne nitidis, inferne pallidis, primariis nervis utrinque prominentibus. Paniculæ foliis paullo longioribus, pedunculis primariis ac secundariis longis, pedicellis circiter ½″ longis. Calycis lobi triangularés salvati post anthesin reflexi mox perituri unam lineam metientes, parce pubescentes, lamina lobi minus obovata pallida nervis prominulis percursa 1″ attingente. Corollæ lobi lati lineares obtusi præcipue interius pilis apice glanduliferis vestiti 2–3″ longi, 1′ lati. Filamenta subulata corollæ lobis breviora, cum iis in expansione floris stellatim patentia, ac pariter haud aliis persistentia. Discus expansus vix lobatus in insertione filamenti. Stylus glaber; stigmatibus pariter glabris.

In humidosis prope civitatem Thaiping, juxta flumen Larut in Peninsula Malayana.

A NEW SPECIES OF *ALBUCA* FROM ADEN.

By H. N. Ridley, M.A., F.L.S.

In a small collection of plants made by Major Yerbury at Aden, in the spring of this year, there is an undescribed species of *Albuca* belonging to the section *Pallastema*. The species of this genus are widely spread over Tropical and South Africa, but none have been hitherto recorded from as far north as Arabia. The section to which it belongs is typically a Tropical African one, and it seems most nearly allied to *A. abyssinica* Jacq.

Albuca Yerburyi, n. sp. — Bulbus. . . . . Folia linearia lanceolata basi hispida, 14-uncialia, 3–4 lin. lata. Scapus plus quam 9-uncialis, racemus laxus. Flores 9 vel ultra, semiuncíales, pedicellati; pedicelli tenues ¼-uncia longi, bracteæ membranaceæ lanceolatæ longe acuminatæ, quam pedicelli longiores vix semiunciales. Sepala lanceolata oblonga acutiuscula, petala subsimilia latiora obtusa, stamina omnia fertilia quam petala paullo breviora, filamenta basi dilatata complanata, supra filiformia, pistillum staminibus æquale, stylus filiformis gracilis, ovarium ovoideum quam stylus brevius, stigmata ovato-deltoidea. Capsula erecta ovata semiuncialis.

Aden. Major Yerbury, 1884, No. 7 in Herb. Mus. Brit. "Flowers yellow. Only found within the last 200 ft. of the Shum-Shum Range. Flowers in March."

PLANTS RECORDED IN WESTERNESS ADDITIONAL TO 'TOPOGRAPHICAL BOTANY,'

By the Revs. W. R. Linton, M.A.. and E. F. Linton, M.A.

The following plants were all gathered, during August of this year, within a small area south of Loch Sunart, in the district called Westerness, and will need few special remarks. A few were collected near the pier, at the entrance of Loch Aline, while we were waiting for a "machine" to convey us to our friends at Rahoy, ten miles further north. The whole of the remainder were gathered during the next day (Saturday) and the morning of Monday, in the neighbourhood of Rahoy, a farm situate close to Loch Teachus, a branch of Loch Sunart. Most are what we should call common plants. The country is hilly, rising steeply to eminences of 1600 and 1800 feet, but there is hardly any denudation of rock. Scarcely any cultivated fields were observable, the farms being pastoral. Great care has been taken to prevent errors from creeping into the list; and for security, a few plants which might have been thought open to question were submitted to Mr. A. Bennett, of Croydon.

Raphanus Raphanistrum L.
Sinapis arvensis L.
Sisymbrium officinale Scop.
Nasturtium officinale Brown.
Cochlearia officinale L., *a. littoralis*. This form not distinctly recorded.
Capsella Bursa-pastoris Mœnch.
Polygala depressa Wender.
Lychnis diurna Sibth.
Cerastium glomeratum Thuil.
Stellaria Holostea L.
Sagina subulata Wimm. — *S. nodosa* Meyer.
Spergularia marginata Syme, E.B.
Hypericum tetrapterum Fries.
Geranium molle L. — *G. Robertianum* L.
Acer Pseudoplatanus L. Reproducing itself, as usual, freely.
Agrimonia Eupatoria L.
Alchemilla arvensis Scop.
Potentilla Anserina L.
Comarum palustre L.
Geum urbanum L. — *G. intermedium* Ehrh. At Rahoy; also at Strome Ferry, West Ross.
Rosa spinosissima L. It is perhaps worth mentioning that *R. Sabini* grew here in small quantity. — *R. mollissima* Willd. — *R. dumalis* Bechst.
Pyrus Aucuparia Gaert.
Epilobium obscurum Schreb. In quantity at one spot, Rahoy.
Callitriche platycarpa Kuetz.
Sanicula europæa L.
Œnanthe crocata L.
Daucus Carota L.
Torilis Anthriscus Gaert.
Hedera Helix L.
Lonicera Periclymenum L.
Asperula odorata L.
Arctium minus Schkuhr.
Artemisia vulgaris L.
Senecio vulgaris L. — *S. aquaticus* Huds.
Inula Helenium L. At two spots, a mile and a half apart, each within about a quarter of a mile of a habitation, but in each case upstream, and no gardens kept.
Lapsana communis L.
Crepis paludosa Mœnch.
Hieracium crocatum Fries. Fairly distributed; near sea-level. (Mr. A. Bennett confirms the naming).
Scrophularia nodosa L.

Veronica scutellata L.
Lamium purpureum L.
Myosotis repens Don.
Centunculus minimus L. In two localities, Rahoy and Loch Aline, ten miles apart; in each case in wet turfy ground within reach of a high tide. This plant is not hitherto recorded farther north than "Clyde Isles," on the west coast of Scotland; though on the east it is recorded for Elgin and Easterness.
Plantago Coronopus L.
Chenopodium album L.
Rumex obtusifolius Auct.
Polygonum Convolvulus L. — *P. aviculare* L.
Mercurialis perennis L.
Urtica dioica L.
Quercus Robur L. Already recorded; *Q. pedunculata* was the only form noticed.
Betula alba L., var. *pubescens*.
Salix laurina Sm. A fine bush or two, growing as at Portree (Skye), not much above sea-level. — *S. repens* L. Apparently typical.
Potamogeton polygonifolius Pour.
Triglochin maritimum L.
Habenaria chlorantha Bab. Aggregate previously recorded.
Scilla nutans Sm.
Allium ursinum L.
Luzula multiflora Koch.
Juncus conglomeratus L.—*J. lamprocarpus* Ehrh.—*J. Gerardi* Lois.
Blysmus rufus Link.
Scirpus palustris L.—*S. uniglumis* Link.—Marshy ground about 500 ft. up. — *S. multicaulis* Sm. — *S. pauciflorus* Lightf. — *S. setaceus* L. — *S. lacustris* L.
Eriophorum latifolium Hoppe. Only one plant seen, *E. angustifolium* being the common species.
Carex remota L. A few plants in a damp copse. — *C. pilulifera* L. — *C. Œderi* Ehrh. A small form growing by the side of the Loch Teachus (salt), which we took to be *C. lepidocarpa*. Mr. A. Bennett considers it to be a varietal form of *C. Œderi*.—*C. ampullacea* Good. Form? The type is recorded, but a form we found, at about 800 ft., seems to be intermediate between this and *C. vesicaria*, and to our eyes was not very different from *C. involuta*. Mr. A. Bennett hesitates to name it so.
Alopecurus geniculatus L.
Phragmites communis Trin. Abundant.
Avena elatior L., var. *nodosum*.
Holcus mollis L. It is extraordinary how widely this grass is distributed, considering its scarcity.
Triodia decumbens Beauv.
Glyceria fluitans Brown.
Sclerochloa maritima Lindl.
Poa pratensis L.
Festuca ovina L., var. *glauca*. By Loch Aline; but not so abundant as at Uig in Skye.
Bromus asper Murr., *α. serotinus*.
Brachypodium sylvaticum R. & S.
Nardus stricta L.
Asplenium Trichomanes L.
Athyrium Filix-fœmina Bernh. Apparently the form *rhæticum*.
Aspidium aculeatum Sw., and var. *lobatum*.
Nephrodium Filix-mas Rich. Also *N. Borreri*, not so abundant as the type, but very distinctly marked where it grew, the extremities of the pinnules being almost square, and looking almost as if they had been shorn off.
Chara fragilis Desv., var.? This

smooth form grew in a small running stream, 980 ft. above sea-level, and appeared to us most like the var. *delicatula*. It is not yet ascertained whether it is this variety.

A SYNOPSIS OF THE GENUS *SELAGINELLA*.

By J. G. Baker, F.R.S., &c.

(Continued from p. 300.)

181. S. versicolor Spring Mon. ii. 123. — Stem slender, suberect, stoloniferous from the base, copiously pinnate, the ascending branches copiously compound. Leaves of the lower plane contiguous and ascending, spreading and spaced on the main stem, oblong or oblong-lanceolate, obtuse or subacute, $\frac{1}{8}$–$\frac{1}{6}$ in. long, bright green, membranous, unequal-sided, broadly rounded, shortly ciliated, and imbricated over the stem on the upper side at the base; leaves of the upper plane one-half as long, broad ovate, with a cusp as long as the lamina. Spikes square, $\frac{1}{2}$ lin. diam.; bracts ovate-cuspidate, membranous, strongly keeled.

Hab. Senegambia, *Heudelot*. Angola, in the provinces of Pungo, Andango, and Golungo Alto, *Welwitsch* 41, 42!

182. S. minima Spring Mon. ii. 86. — *Lycopodium pusillum* Leprieur. — Stem $\frac{1}{2}$–1 in. long, very slender, suberect, simple or slightly compound. Leaves of the lower plane contiguous and ascending in the upper part, spaced and spreading in the lower part of the stem, oblong, acute, $\frac{1}{2}$ lin. long, bright green, membranous, rather unequal-sided, broadly rounded, ciliated, and imbricated over the stem on the upper side at the base; leaves of the upper plane one-half as long, ovate, acute. Spikes short, 1 lin. diam.; bracts ovate, acute, similar to the leaves in texture.

Hab. French Guiana, in grassy places near Cayenne, *Leprieur*!

183. S. decrescens Spring in Plant. Vanheurck. i. 29.—Stems suberect, very slender, 1–1½ in. long, simple near the base, closely pinnate above it, with contiguous copiously compound branches. Leaves of the lower plane contiguous above the base of the stem, spreading or the upper ascending, oblong-lanceolate, acute, a line long, bright green, moderately firm in texture, nearly equal-sided, ciliated and cordate, and imbricated over the stem on the upper side at the base; leaves of the upper plane one-half as long, much imbricated, broad ovate, with a cusp as long as the lamina. Spikes short, square, $\frac{1}{2}$ lin. diam.; bracts ovate, acute, crowded, strongly keeled.

Hab. Shaded rocks on the Serras of Santarem, *Spruce* 682*! 943!

184. S. porelloides Spring. Mon. ii. 97; Fée Fil. Ant. tab. 34, fig. 3. — *Lycopodium porelloides* Lam. — Stems slender, suberect, 2–3 in. long, the branches lax, the lower copiously compound. Leaves of the lower plane contiguous and ascending on the branchlets, spreading and spaced on the main stem, ovate or

oblong, subobtuse, a line long, dark green, flaccid, cordate, and conspicuously ciliated on the upper side at the base; leaves of the upper plane one-third as long, ovate-lanceolate, shortly apiculate. Spikes short, 1 lin. diam.; bracts ovate-lanceolate.

Hab. St. Domingo, Guadeloupe, and Mexico.

185. S. MOLLIS A. Br. in Crypt. Nov. Gran. 360, non Fée.— Stems slender, suberect, 3–4 in. long, flat on the face, sulcate down the back, closely pinnate, the branches erecto-patent, the lower copiously compound. Leaves of the lower plane contiguous, ascending, ovate or ovate-lanceolate, acute, $\frac{1}{2}$ lin. long, bright green, moderately firm in texture, nearly equal-sided, rounded on both sides at the base, strongly ciliated on the upper, and a little imbricated over the stem; leaves of the upper plane one-third as long, oblique ovate, much imbricated, shortly cuspidate. Spikes short, square, $\frac{3}{4}$ lin. diam.; bracts ovate, acute, strongly keeled.

Hab. New Granada, in the forests of Ocana, alt. 4000–6000 ft., *Schlim* 1029!

186. S. CONFUSA Spring Mon. ii. 94. — *Lycopodium ornithopodioides* Sw. Syn. Fil. 184, as regards the West Indian plant. — Stems very slender, $\frac{1}{2}$ ft. long, bisulcate down the face, flat on the back, largely pinnate, the ascending branches simple or slightly compound. Leaves of the lower plane spaced and ascending both on the stem and branches, oblique ovate, acute, $\frac{1}{2}$ lin. long, pale green, rather rigid in texture, more produced on the upper side of the midrib, broadly rounded and ciliated on the upper side at the base, and imbricated over the stem; leaves of the upper plane one-half as long, oblique ovate, cuspidate. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, sharply square, $\frac{1}{2}$ lin. diam.; bracts ovate-cuspidate, strongly keeled.

Hab. Mountains of Jamaica, 5000–6000 ft., *Swartz*! *Wilson* 764! *Jenman*! Will most likely prove to be a montane variety of *S. radiata*.

187. S. RADIATA Baker. — *S. ciliata* A. Br. in Ann. Sc. Nat. ser. 4, xiii. 68. — *S. increscentifolia* Spring Mon. ii. 106. — *S. Novæ-hollandiæ* Spring Mon. ii. 209. — *S. Warcewiczii* Klotsch. — *Lycopodium radiatum* Aublet. — *L. Novæ-hollandiæ* Swartz. — *L. ciliatum* Willd. — Stems slender, suberect, $\frac{1}{2}$–1 ft. long, acutely angled down the face, sometimes sending out stolons from the base, closely pinnate, the ascending branches copiously compound, not whip-like at the tip. Leaves of the lower plane continuous on the branchlets, spaced on the main stem, erecto-patent, oblique ovate, acute, $\frac{1}{2}$–1 lin. long, bright green, rather rigid in texture, unequal-sided, very cordate and strongly ciliated, and much imbricated over the stem on the upper side at the base; leaves of the upper plane one-half as long, ovate, cuspidate. Spikes square, $\frac{1}{4}$–1 in. long, $\frac{1}{2}$ lin. diam.; bracts ovate-cuspidate, strongly keeled.

Hab. Tropical America, from Costa-Rica and Guiana to Peru, ascending the Andes to 8000–9000 ft. *S. bulbifera* Baker in Gard. Chron. 1867, 950, which differs from the type by its decumbent stems sending out copious root-fibres in the lower half, many of the lower branchlets excurrent and whip-like at the tip, and bearing bulbillæ, which reproduce the plant, leaves spuriously 3-nerved and

not distinctly ciliated, is most likely a form of this species produced by cultivation in a damp warm atmosphere.

Series III.—Rosulatæ.

188. S. INVOLVENS Spring Mon. ii. 63. — *S. circinalis* Presl. — *Lycopodium circinale* Thunb. Fl. Jap. 341. — *L. involvens* Sw. — *L. pulvinatum* Hook. & Grev.—Stems very densely tufted, 2–6 in. long, deltoid, 2–3-pinnate, branched nearly or quite from the base, the branching of all grades between flabellate and pinnate. Leaves of the lower plane very crowded, ascending, ovate, with a distinct cusp, about a line long, bright green, very thick and rigid in texture, serrulate on both margins, nearly equal-sided; leaves of the upper plane nearly as long, oblique ovate-lanceolate, with a distinct cusp. Spikes square, ¾ lin. diam.; bracts deltoid cuspidate, acutely keeled.

Var. *S. Veitchii* Macnab Selag. 10, tab. 1, figs. 1–5. — Leaves less cuspidate and not so much imbricated, those of the lower plane more curved, those of the upper more lanceolate. Bracts ovate-lanceolate.

Hab. Japan, Corea Amoor-land, China, the Philippine Islands, and East Himalayas.

189. S. DIGITATA Spring Mon. ii. 73. — Stems in tufts from the nodes of a thread-like rhizome, ½–1 in. long, simple in the lower two-thirds, deltoid and bipinnate in the upper third, the very close divisions rolled together, the branching between pinnate and and flabellate. Leaves of the lower plane much imbricated, erecto-patent, oblong, obtuse, ¼ lin. long, dull green, very rigid in texture; leaves of the upper plane nearly as long, oblique ovate, subacute. Spikes not seen.

Hab. Madagascar, at Ambongo, *Pervillé* 608!

190. S. IMBRICATA Spring Mon. ii. 70; Decaisne Pl. Arab. t. 7. — *Lycopodium imbricatum* Forsk. — *L. circinale* Desv. — Stems densely tufted, erect, ½–1 ft. long, compound only in the lower third, the primary and secondary divisions pinnate, the tertiary divisions subflabellate and deltoid. Leaves of the lower plane much imbricated, ascending, ovate, obtuse or subacute, dark green, ½ lin. long, very thick and rigid in texture; leaves of the upper plane nearly as long, oblique ovate, acute. Spikes short, square, ½ lin. diam.; bracts ovate, acute, strongly keeled.

Hab. Arabia, Abyssinia, and Zambesi-land.

191. S. STAUNTONIANA Spring Mon. ii. 71. — *S. affinis* Milde Fil. Eur. 271, non A. Br. — Stems about a span long, branched in the upper half, rhomboid, decompound, the primary and secondary branching pinnate, the tertiary subflabellate. Leaves of the lower plane crowded, ascending, oblique ovate, acute, ½ lin. long, firm in texture, bright green, turning reddish when old; leaves of the upper plane one-half as long, ovate-lanceolate, shortly cuspidate. Spikes square, ¼–½ in. long, ½ lin. diam.; bracts ovate cuspidate, strongly keeled.

Hab. North China, *Sir G. Staunton*, *Bushell*! *Bretschneider* 877!

192. S. CONVOLUTA Spring Mon. ii. 62.—*S. hygrometrica* Spring. —*Lycopodium bryopteris* Aublet, non Linn.—*L. convolutum* Arnott. *L. hygrometricum* Mart. — *L. revolutum* Hook. & Grev. — Stems densely tufted, 3–6 in. long, compound nearly to the base, the primary branching pinnate, the short broad erecto-patent pinnæ between pinnate and flabellate. Leaves of the lower plane much imbricated, ascending, ovate, acute, $\frac{1}{2}$ lin. long, serrulate, bright green, firm and rigid in texture; leaves of the upper plane one-half as long, oblique ovate, acute. Spikes square, $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. diam.; bracts ovate cuspidate, strongly keeled.

Hab. Tropical America from Mexico to South Brazil. This is the plant that represents *Lycopodium circinale* in the herbarium of Linnæus; but the plant of the younger Linnæus in Smith's collection is an example of *S. involvens*, gathered in Japan by Thunberg.

193. S. BRYOPTERIS Baker.—*S. tamariscina* Spring.—*Lycopodium bryopteris* Linn. Sp. 1567. — *L. circinale* Linn. Syst. Veg. xiii. 704, non Linn. herb.—*L. tamariscinum* Desv.—Dill. Musc. tab. 66, fig. xi. —Stems densely tufted, simple in the lower two-thirds, deltoid and decompound in the upper third, the primary and secondary branching pinnate, the ultimate divisions midway between pinnate and flabellate. Leaves of the lower plane much imbricated, ascending, ovate cuspidate, dark green on the face, pale green on the back, $\frac{1}{2}$ lin. long, firm and rigid in texture, obscurely serrulate; leaves of the upper plane nearly as long, oblique ovate, with a large cusp. Spikes short, square, $\frac{1}{2}$ lin. diam.; bracts ovate cuspidate, strongly keeled.

Hab. Central and Peninsular India.

194. S. PILIFERA A. Br. in Ind. Sem. Hort. Berol. 1857, App. 20. —Stems densely tufted, 3–4 in. long, copiously compound, cuneate, the branching of all grades midway between pinnate and flabellate, and the branches erecto-patent. Leaves of the lower plane crowded on the branches, rather spaced on the main stem, ascending, oblique ovate, $\frac{1}{2}$ lin. long, distinctly cuspidate, pale green, rigid in texture, serrulate, dilated and ciliated on the upper side at the base; leaves of the upper plane one-half as long, oblique lanceolate, similarly cuspidate. Spikes square, $\frac{1}{4}$–$\frac{1}{2}$ in. long, $\frac{1}{2}$ lin. diam.; bracts ovate-lanceolate, strongly keeled.

Hab. Texas, *Wright*! Plateau of Central Mexico, alt. 6000–8000 ft., *Parry & Palmer* 1008! A rare species in cultivation.

195. S. LEPIDOPHYLLA Spring Mon. ii. 72. — *Lycopodium lepidophyllum* Hook. Ic. t. 162–163.—Stems densely tufted, 2–4 in. long, branched down to the base, the primary branching closely pinnate, the broad cuneate ascending pinnæ copiously subflabellately compound. Leaves of the lower plane much imbricated, ascending, oblique ovate, obtuse, $\frac{1}{2}$ lin. long, thick and rigid in texture, minutely ciliated, green on the face, paler on the back, and when old tinted red-brown; leaves of the upper plane nearly as long, oblique ovate, obtuse. Spikes square, $\frac{1}{4}$–$\frac{1}{2}$ in, long, $\frac{1}{2}$ lin. diam.; bracts deltoid, acutely keeled.

Hab. Tropical America from Texas and Mexico to Peru, in exposed places.

196. S. Orbigniana Spring Mon. ii. 68. — Stems tufted, 4–5 in. long, pyramidal, the primary branching pinnate, the branches erecto-patent, with very short branchlets. Leaves of the lower plane crowded, ovate, subfalcate, cuspidate, above a line long, rigid in texture, dark green above, pale and shining beneath, the upper margin membranous and unequally serrulate, the lower not white-edged, but shortly rigidly ciliated; leaves of the upper plane one-half as long, ovate acuminate, aristate. Spikes $\frac{1}{4}$–$\frac{1}{2}$ in. long, sharply square; bracts ovate acuminate, acutely keeled.

Hab. Andes of Bolivia, *D'Orbigny*. Intermediate between *cuspidata* and *imbricata*.

(To be continued.)

SHORT NOTES.

Lysimachia thyrsiflora L.—I do not remember to have seen it recorded that by cultivation this plant (which in the wild state is almost glabrous) becomes hairy, the amount of hairs seeming to depend on the absence of moisture in the soil and in the air. I have observed the same thing in *Polygonum amphibium* L., the plant growing in water being glabrous, but in dry land being covered with hairs. An analogous change comes over *Saxifraga Hirculus* L. when grown in the open ground in rich light soil, with full exposure to the sun. I would advise any of your readers who cultivate our British plants to grow the last-named plant under the conditions I have referred to; they will thereby learn a lesson which none of our books are able to teach us.—A. Craig-Christie.

Marine Algæ at Lyme Regis.—This place, situated at the top of the great bend or bay which extends from the Bill of Portland to the Start Point, though not to be called a good hunting-ground for Algæ, possesses some points of interest. The chief feature in the marine botany may be said to be the great abundance of *Sphacelaria scoparia* and *Rhodomela lycopodioides*, *Polysiphonia fibrillosa*, both with capsules and tetraspores, and of a large size, is also frequent. In the rock-pools are found *Padina Pavonia*, *Taonia atomaria*, *Styridia filamentosa*, and *Callithamnion corymbosum*.—T. Walker.

Additions to 'Topographical Botany.'—The following plants, not recorded for their respective counties in and on the borders of Wales, were collected or seen by me during the past summer:—*Alsine verna*. Heath near Tyn-y-Groes, Dolgelley, Merioneth.—*Geranium columbinum* L. Aberedw, Radnorshire; Three Cocks Junction, Brecon.—*Linum angustifolium* L. Railway bank, Erwood, Radnor.—*Trifolium arvense* L. Railway, Three Cocks Junction, Brecon. — *Rubus saxatilis* L. Grassy bank by Rhayader Cwm, Festiniog, Merioneth, growing with *Oxyria reniformis* L. and *Asplenium viride*. — *Senecio Jacobæa* L., var. without ray florets. Roadside, Festiniog, Merioneth.—*Carduus heterophyllus* L. Meadows near Rhayader Cwm, Festiniog, Merioneth. — *Dipsacus pilosus*.

Aberedw, Radnor.—*Campanula patula* L. Near Boughrood, Radnor. *Centaurea Scabiosa* L. Rhayader Cwm, Festiniog, Merioneth.—*Lysimachia vulgaris* L. Llangorse Mere, Brecon.—*Polygonum lapathifolium* L. Maes-y-neuadd, Harlech, Merioneth.—*Allium Schænoprasum* L. Among the stones in the River Wye at Boughrood, Radnor.—*A. ursinum* L. Woods at Craig-pwll-du, Radnor.—*Triticum junceum* and *Festuca rubra* v. *arenaria*. Sand-hills, Barmouth, Merioneth. — *Phragmites communis* Beauv. Harlech, Merioneth.—*Polypodium calcareum*. Aberedw Woods, Radnor. — *Selaginella selaginoides*. Abundant on the heaths of Festiniog, Merioneth.—H. N. Ridley.

Hieracium argenteum (Fries) in Montgomeryshire. — Some six or seven years ago I collected, on Craig Breidden and Moel-y-golfa, adjacent hills in Montgomeryshire, several Hieracia, determining most of them to be *H. lasiophyllum* Koch (= *cinerascens* Jord.). One of the specimens then collected I forwarded to Mr. Arthur Bennett, who not long ago pointed out to me that Mr. Backhouse had upon examination pronounced it to be not *H. lasiophyllum*, but *argenteum*. The two plants are very similar, both being allied to *H. pallidum*, subspecies of which they probably are. *H. argenteum*, however, is distinguished at a glance by its intensely glaucous bloom on the stem and under side of leaves. Thus Montgomeryshire may be added as possessing a locality for this species, without, however, invalidating the previously recorded habitat for the true *H. lasiophyllum* Koch, which occurs on both the hills in some plenty.—J. Cosmo Melvill.

NOTICES OF BOOKS.

Diseases of Field and Garden Crops, chiefly such as are caused by Fungi. By Worthington G. Smith, F.L.S. London: Macmillan & Co. 1884. Pp. xxiv. 353.

Under the above title Mr. Smith has published, in a handy form, his lectures on the diseases of crops, delivered recently under the auspices of the Institute of Agriculture. While the main interest attaching to the book is perhaps agricultural and horticultural, the botanist will find much that is both new and interesting in its pages, since Mr. Smith has not confined himself in his lectures to old well-worn facts and theories, but has presented us with new views and original subjects. A noteworthy feature of the book is the originality of the illustrations and the skill with which they have been drawn. It may be that in some cases one may differ from the interpretation thus offered, but, however that may be, Mr. Smith is to be thanked for giving us something fresh to look at in the way of illustrations. Certain botanical woodcuts (first exhibited in Sachs' 'Text-book') have come to be associated in one's mind with familiar mural advertisements from the frequency of their occurrence in, and their apparent indispensability to, every well-regulated botanical handbook.

Mr. Smith has made studies of such diseases as are of economic

importance, or are likely to become so, and much sensible advice is offered to the practical grower of crops. Of the diseases of corn and grass plants we have *Puccinia rubigo-vera*, *P. graminis*, *Claviceps purpurea*, *Tilletia caries*, *Ustilago carbo*, *Erysiphe graminis*, *Isaria fuciformis*, the author's three new species of *Fusisporium* (*F. culmorum*, *F. hordei*, and *F. lolii* W. Sm.), and the ear-cockle, *Tylenchus tritici*; of clover, *Peronospora trifoliorum* and *P. exigua* W. Sm., and *Cuscuta trifolii*; of potatoes, *Phytophthora infestans*, *Fusisporium solani*, *Tuburcinia scabies* and *Peziza postuma*; of onions, *Puccinia mixta*, *Peronospora Schleideniana*, *Urocystis cepulæ*, and *Mucor subtilissimus*; of turnips, *Oidium balsamii*, *Plasmodiophora brassicæ*; and the *Peronospora parasitica* and *Cystopus candidus* so destructive to *Cruciferæ*. Studies of these and other diseases infesting our crops are certain to be of much practical value in the hands of those who have the welfare of crops under their special care. Some of the Fungi enumerated, though occurring plentifully on the hosts named, may not be the actual causes of disease, but by thus calling the attention of many constant observers to their structure, &c., the author has rendered a valuable service towards the discovery of their real nature. Mr. Smith makes a strenuous effort to dispose of the evidence in favour of the heterœcism of the *Uredineæ*, but such an effort is hardly likely to succeed now. It was necessary that a book with the practical aim of this one should be written attractively and with simplicity, and this part of his object Mr. Smith has done his best and successfully to attain. Not only to those interested in the crops, but also to the increasing class interested in their diseases, Mr. Smith's book will prove a handy, easily obtained, and excellent guide. G. M.

Traité de Botanique Médicale phanerogamique. Par H. Baillon. Paris: Hatchette. 1884. 8vo, pp. 1500, with 3487 figures.

As might be expected from the size of the work and the eminence of its author, we have in the volume before us perhaps the most comprehensive treatise upon medical botany which has yet been issued. The first part (464 pages) is devoted to a general sketch of the organography, histology, and vegetable physiology; the remainder is occupied with descriptions of medicinal plants, their properties, uses, &c. We do not know whether the two parts are issued separately; there would, however, be much advantage in such a plan, as many besides medical students would be glad to avail themselves of the copiously illustrated introduction to botany, while the medical man might feel justified in contenting himself with the portion which more especially concerns him.

It would be impossible in the space at our disposal to enter into anything like a detailed criticism of this valuable addition to our literature. Nor, indeed, is this necessary. Prof. Baillon's work is too well known to need commendation from us; and this volume is worthy of his reputation. We feel only one regret—that the learned author should have had his attention diverted, even by so useful a book, from his great work, the 'Dictionnaire de Botanique,' the progress of which is anxiously desired by botanists.

New Books.—A. DeCandolle, 'The Origin of Cultivated Plants' (London: C. Kegan Paul: 8vo, pp. viii. 468). — A. De Bary, F. O. Bower, and D. H. Scott, 'Comparative Anatomy of the Vegetative Organs of the Phanerogams and Ferns' (Oxford, Clarendon Press: 8vo, pp. xvi. 659; 241 cuts).—A. Gentil, 'Petite Flore Mancelle' (Le Mans, Monnoyer: 8vo, pp. 220). — G. Marktanner-Turneretscher, 'Ausgewählte Blüthen-Diagramme der Europäischen Flora' (Vienna: Hölder, "1885"; 8vo, pp. iv. 75: tt. 16).

Articles in Journals.—November.

Botanical Gazette (Oct. & Nov.). — G. Vasey & F. L. Scribner, 'A Hybrid Grass' (*Trisetum palustre* × *Eatonia pennsylvanica*).—L. F. Ward, 'The Fossil Flora of the Globe.'

Bot. Centralblatt (Nos. 44–48). — H. Mayr, 'Entstehung und Vertheilung der Secretions-Organe der Fichte und Lärche.'

Botanische Jahrbucher (Oct. 24).—E. Koehne, 'Lythraceæ: der Bau der Blüthen.'—A. Engler, 'Flora des südlichen Japan und der Liu-Kiu Inseln.'—J. C. Maximowicz, 'Amaryllidaceæ sinico-japonicæ' (*Ungernia? Oldhami*, *Lycoris squamigera*, *L. sanguinea*, spp. nn.).—A. G. Nathorst, 'Phanerogamenflora Grönlands im Norden von Melville Bay (76°–82°).

Bot. Zeitung (Nov. 7). — J. Wortmann, 'Studien über geotropische Nachwirkungerscheinungen.' — (Nov. 14). G. Klebs, 'Beitrag zur Kenntniss der Peridineen' (1 tab.).

Botaniska Notiser (Nov. 5). — L. J. Wahlstedt, 'Några Violahybrididiteter för svenska Floran.'—H. Samzelius, 'Några för Södermanland nya växtlokaler.' — G. Lagerheim, 'Mykologiska bidrag.' —S. Almquist, 'Om blomdiagrammet hos *Montia*.'

Bull. Soc. Bot. France (xxx.: Comptes Rendus, 6). — E. Lamy de la Chapelle, 'Lichens de Cauterets, de Lourdes, &c.'—E. Malinvaud, 'Annotations au 4e fasc. des Menthæ exsiccatæ præsertim gallicæ.'

Gardeners' Chronicle (Nov. 15). — *Barkeria Barkeriola* Rchb. f., *Caraguata angustifolia* Baker, spp. nn. — (Nov. 22). *Dendrochilum cucumerinum* Rchb. f., *Hypoxis colchicifolia* Baker, spp. nn.—(Nov. 29). *Arisæma fimbriatum* Mast., *Eria bigibba* Rchb. f., spp. nn.

Magyar Növénytani Lapok.—L. Haynald, Memoir of E. Fenzl.

Midland Naturalist. — W. B. Grove, 'On the *Piloboliдæ*.' — F. Bates, 'On the *Zygnemaceæ*.' — J. E. Bagnai, 'Flora of Warwickshire' (*Juncaceæ—Cyperaceæ*).

Nature.—(Oct. 30).—V. B. Wittrock, 'On the Algic Flora of the Arctic Seas.'—(Nov. 6). M. T. Masters, 'Flowers out of Season.'

Œsterr. Bot. Zeitschrift.—E. Preissmann, 'Flora von Kärnten.' —A. Hausgirg, 'Süsswasseralgen.' — A. Kmet, '*Rosa reversa*.'— L. Schlögel, 'Teratologisches.' — P. G. Strobl, 'Flora des Etna' (cont.).

Pharmaceutical Journal (Nov. 15). — T. Greenish, 'Pine or Forest Wool.'

Science Gossip.—N. F. Davey, 'Bifurcation of the Elm-leaf.'

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P. 27, l. 22 from top, *for* "redevelopes," *read* "re-envelopes." P. 32, l. 6 from bottom, *for* "Qui," *read* "Cui." P. 110, line 11 from top, *for* "Dict. ed. 6 (1771)," *read* "Dict. ed. 8 (1768)"; the former reference is to a later abridgment. P. 121, l. 10 from top, *for* "with," *read* "worth." P. 123, l. 19 & 34 from top, *for* "James," *read* "John." P. 156, l. 3 from bottom, *for* "ECHOLIUM," *read* "ECBOLIUM." P. 197, l. 20 from top, *for* "MESEMBRYANTHEMUM," *read* "MESANTHEMUM." P. 253, l. 7 from top, *for* "Cadogan," *read* "Cologan."

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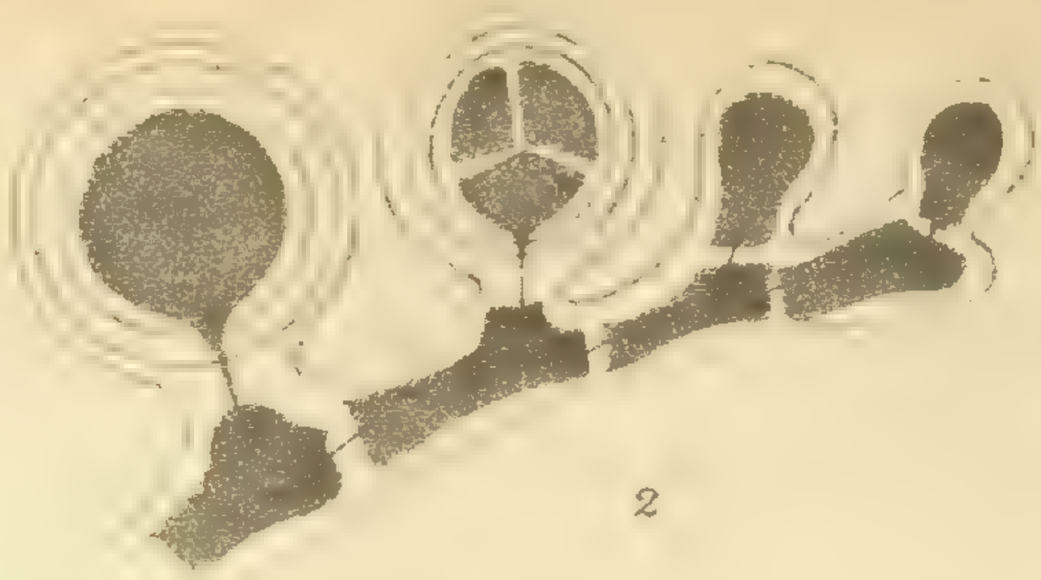

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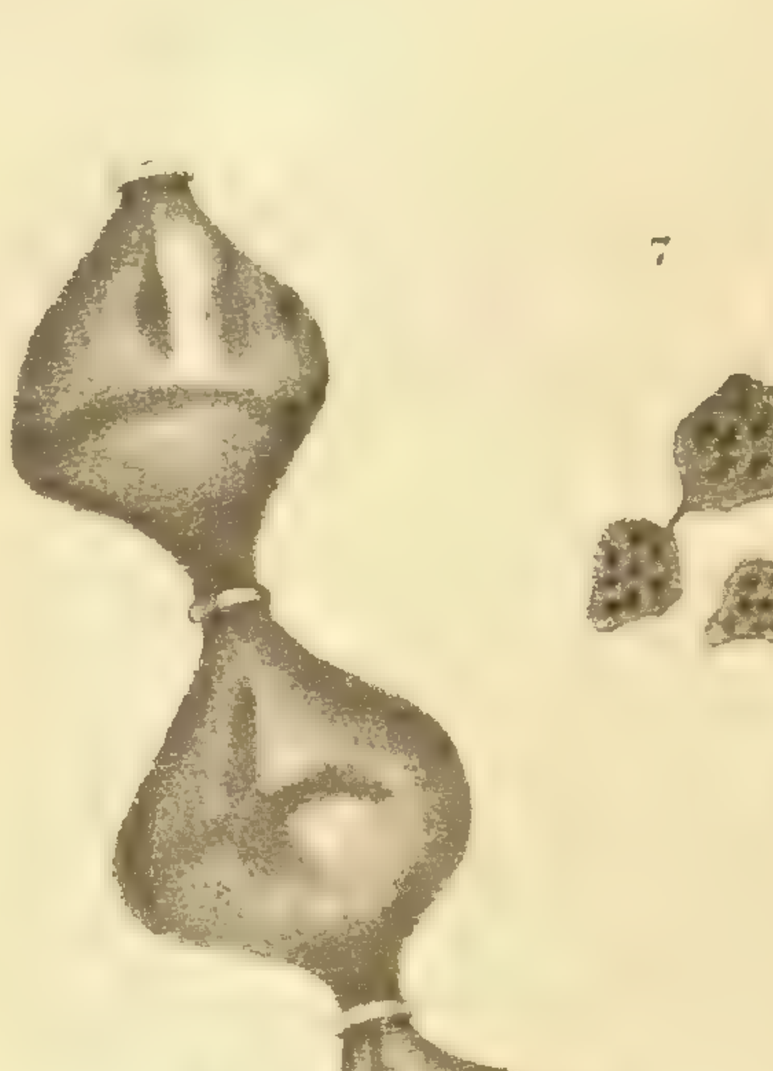

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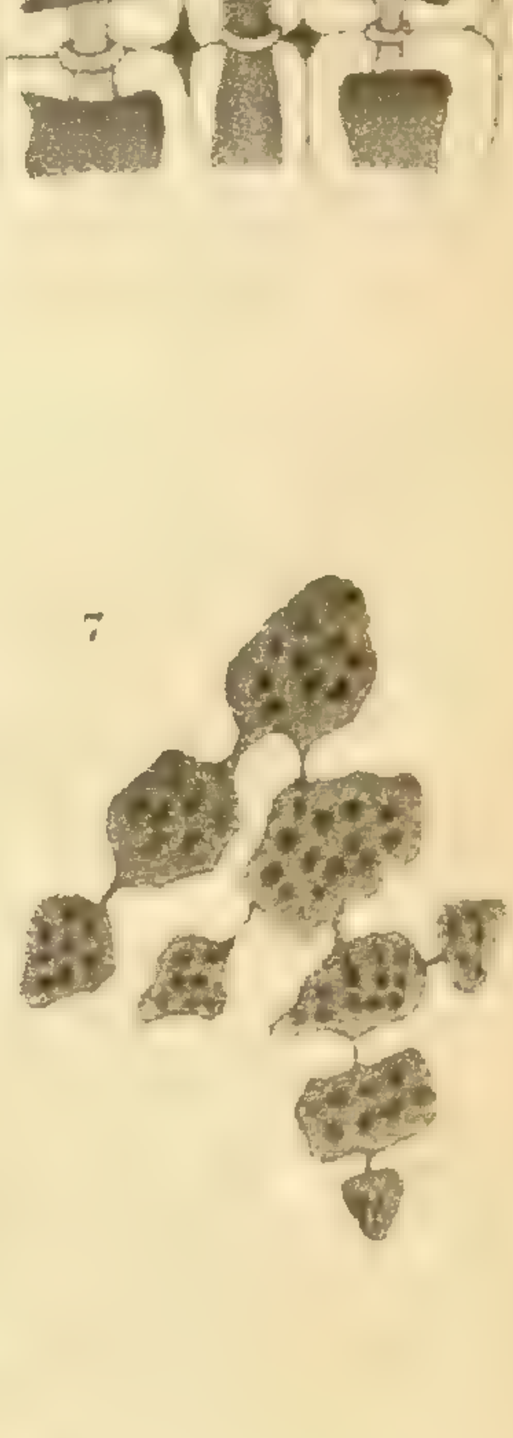

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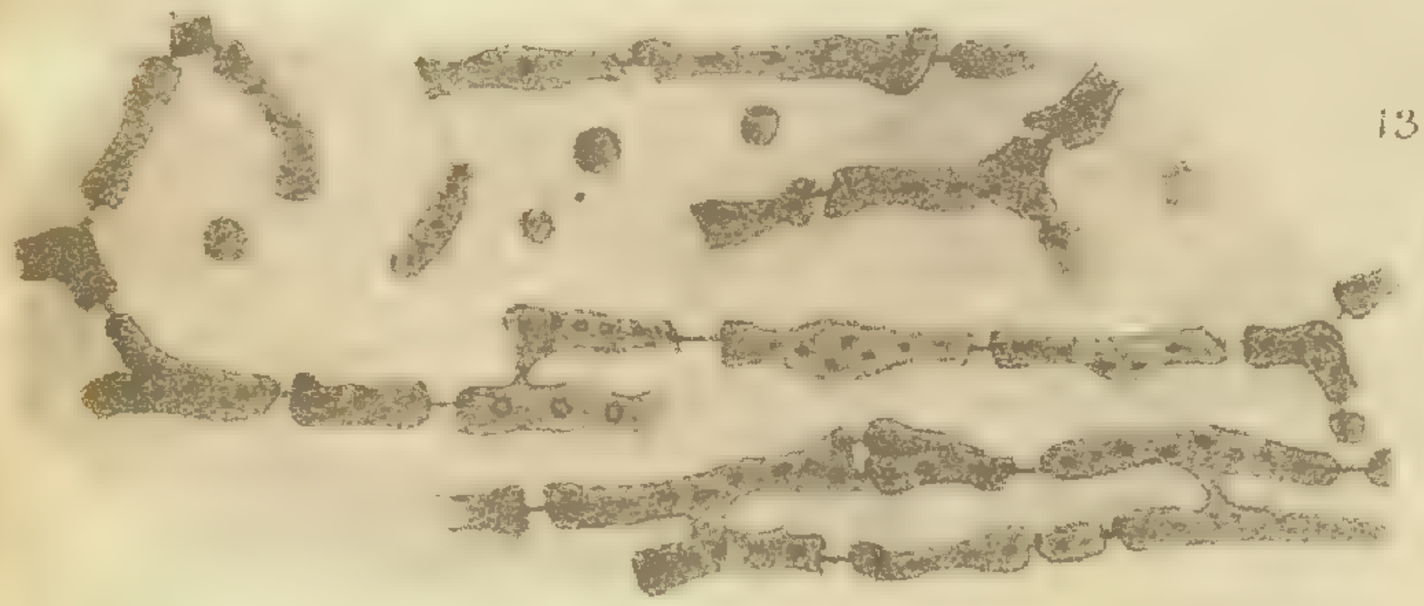

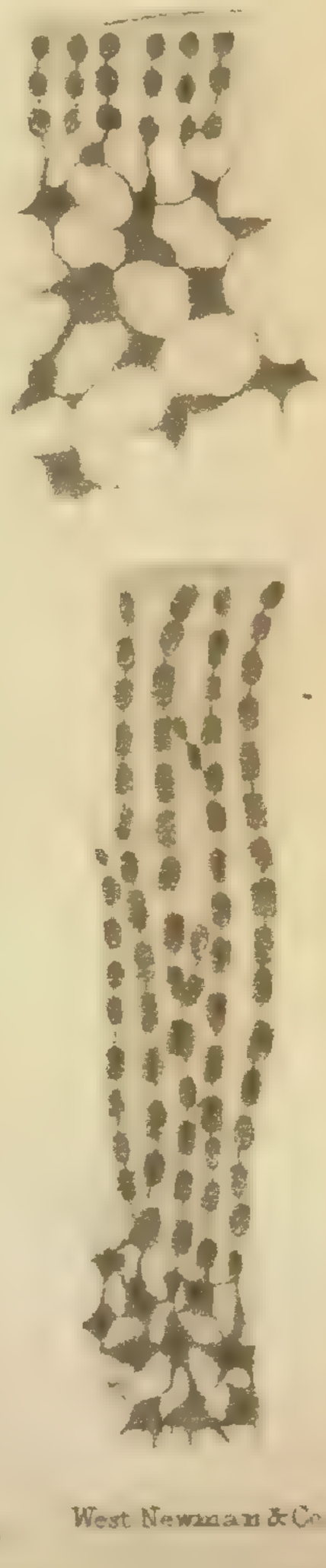

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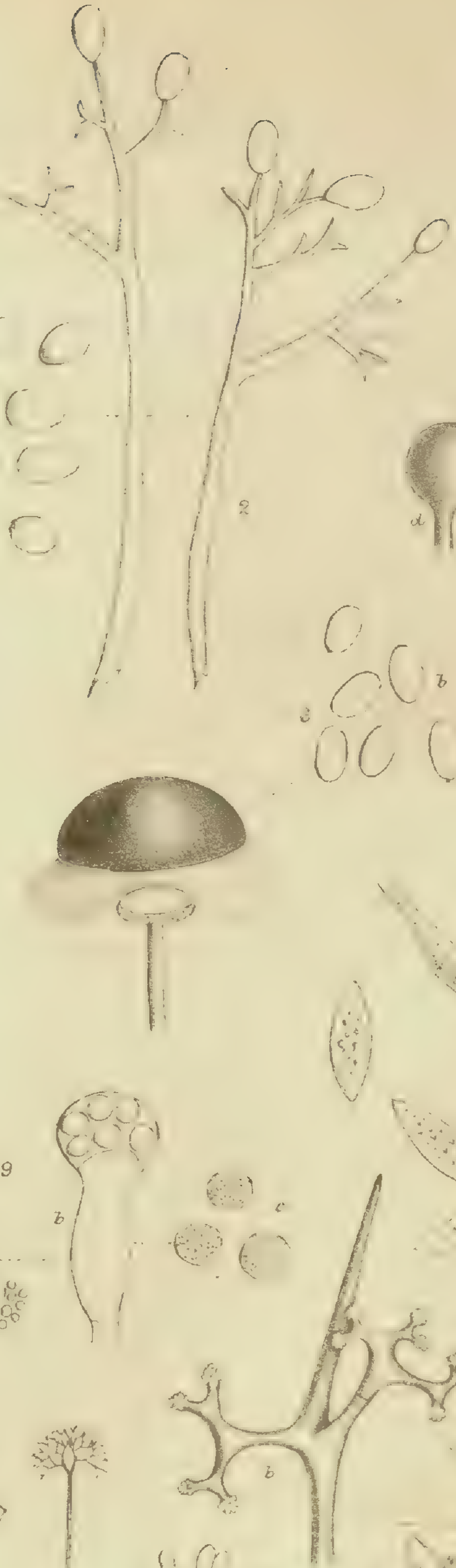

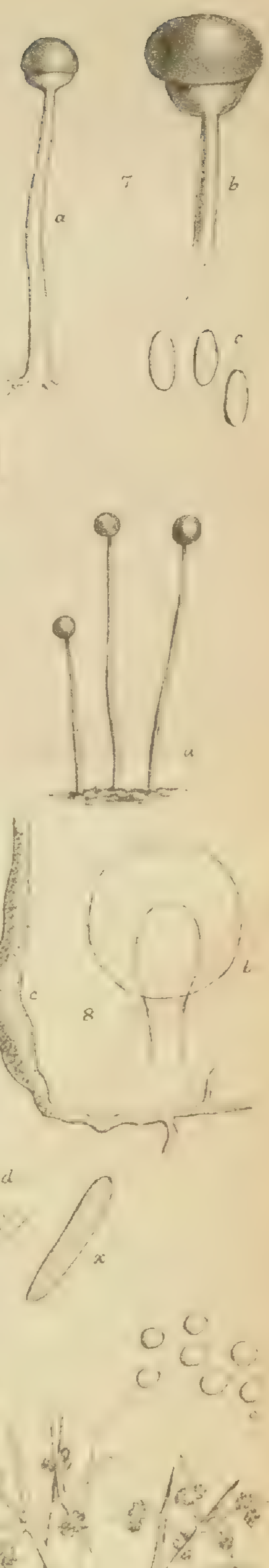

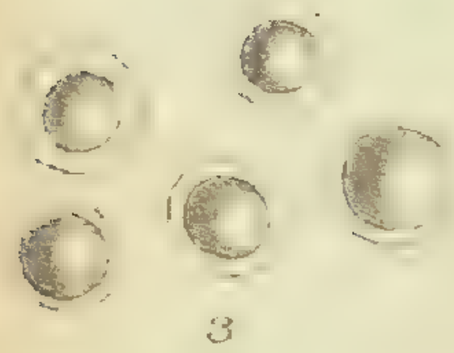

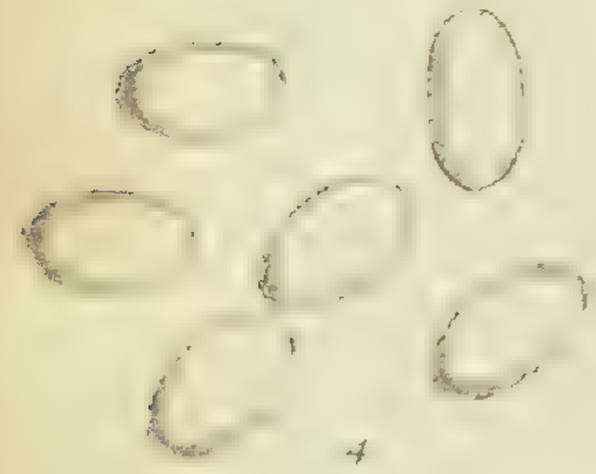

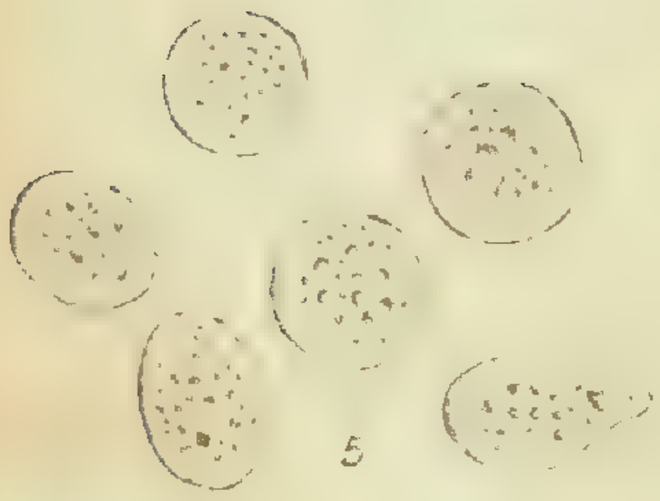

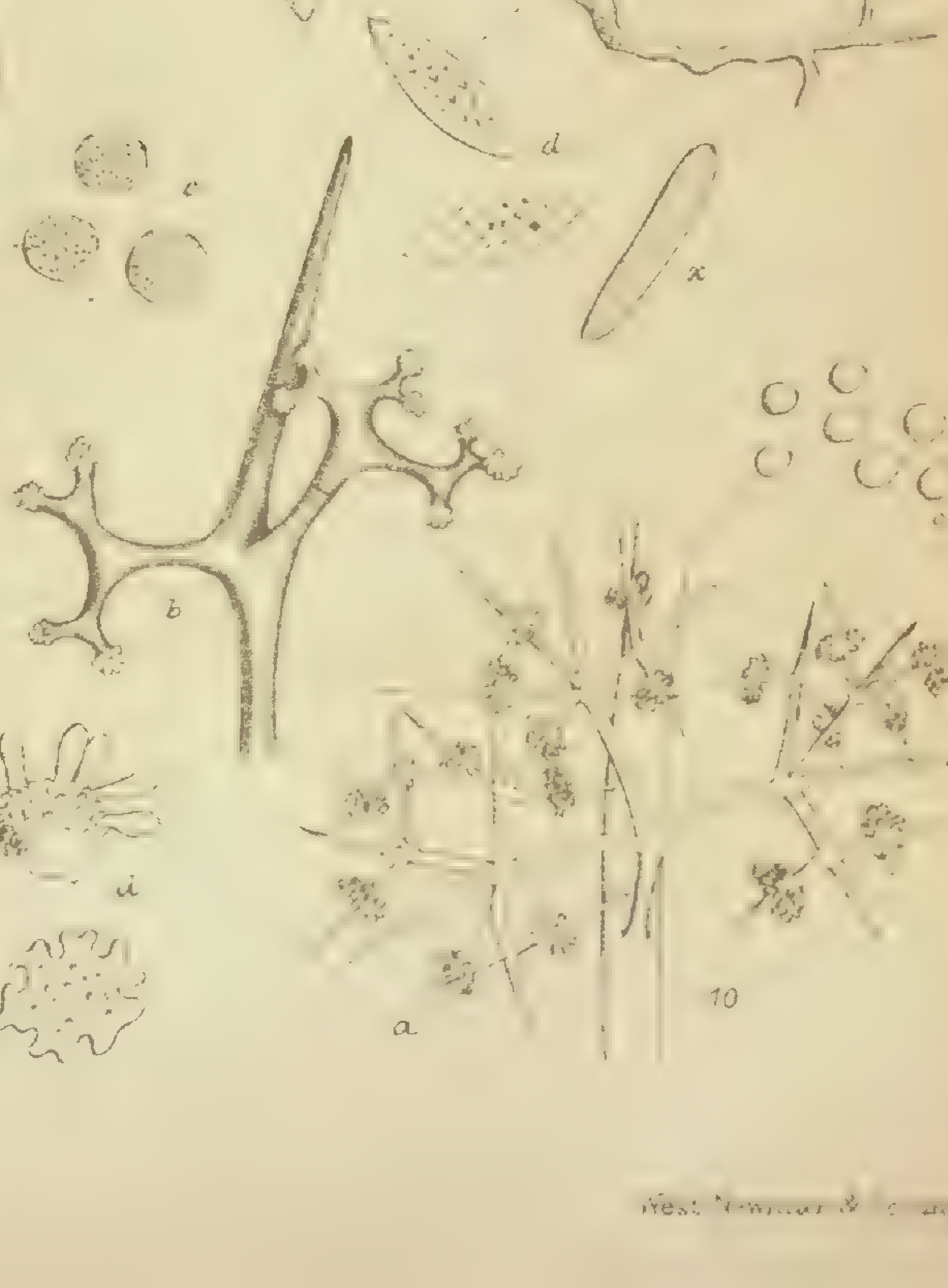

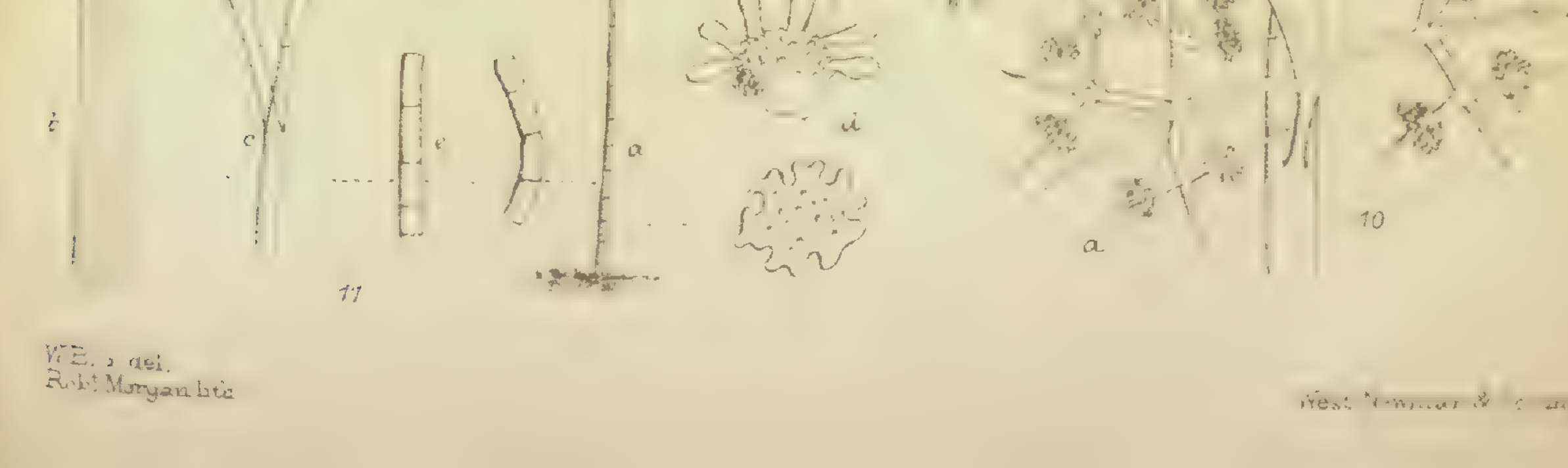

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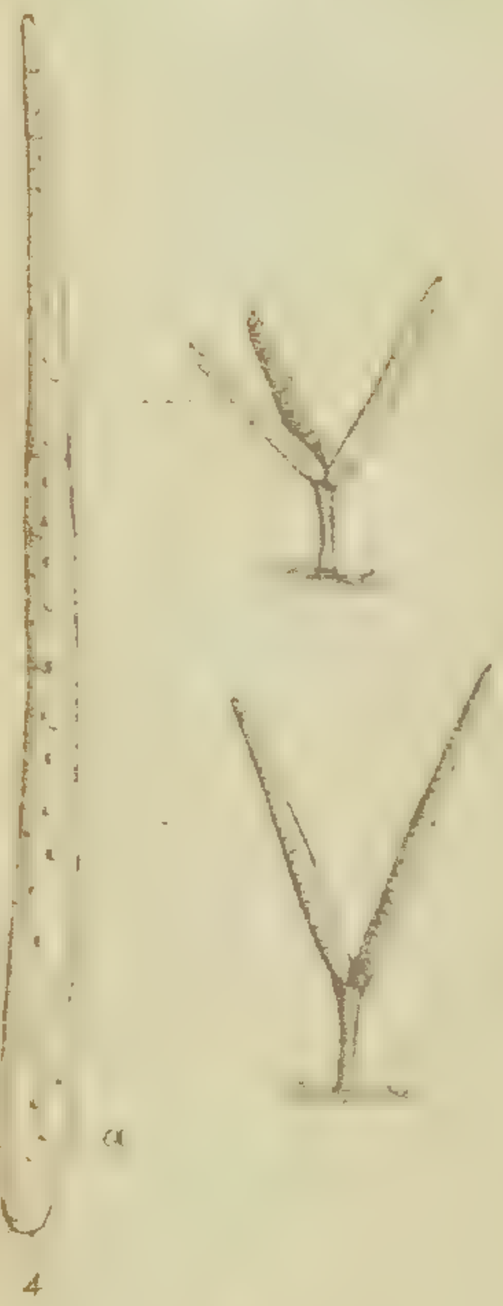

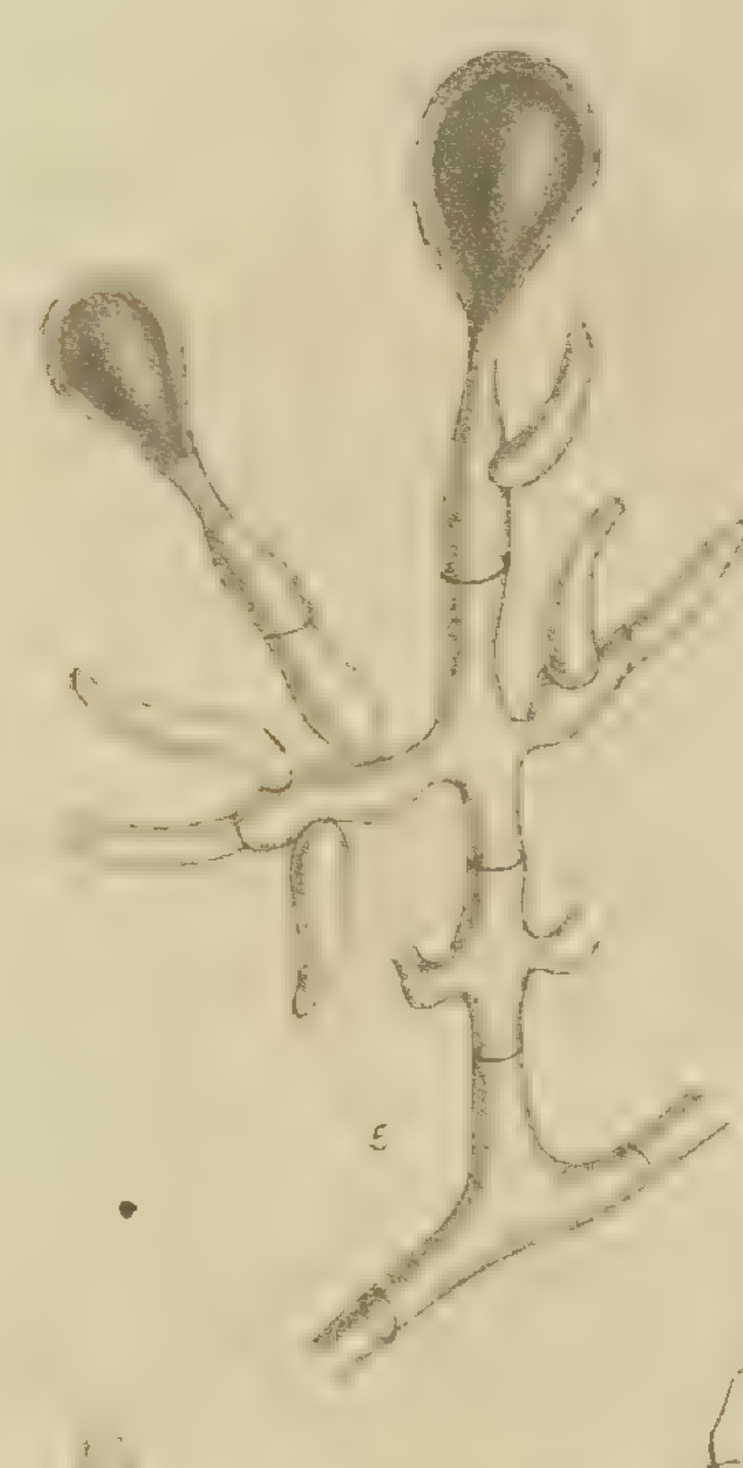

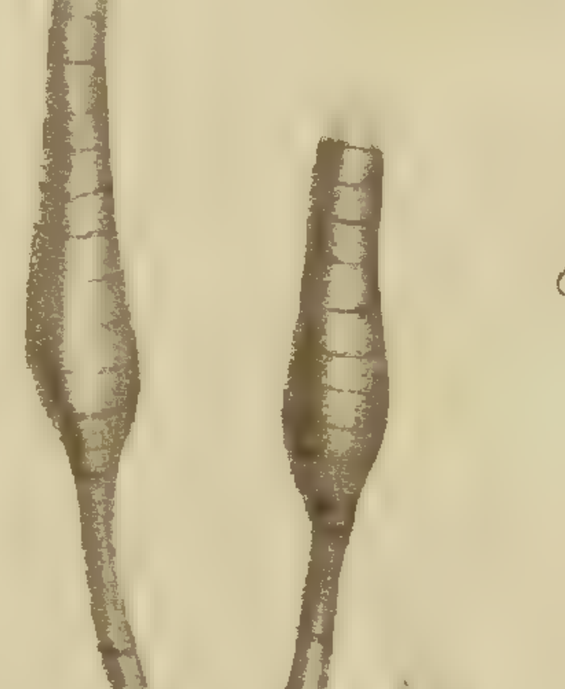

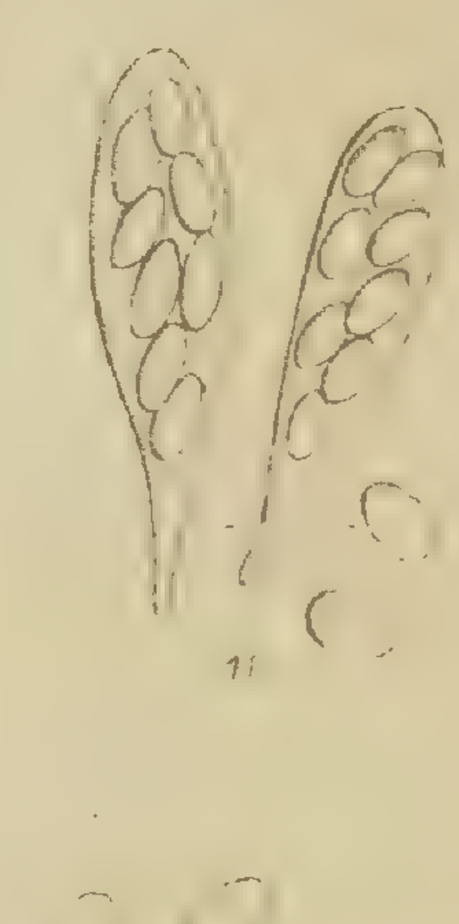

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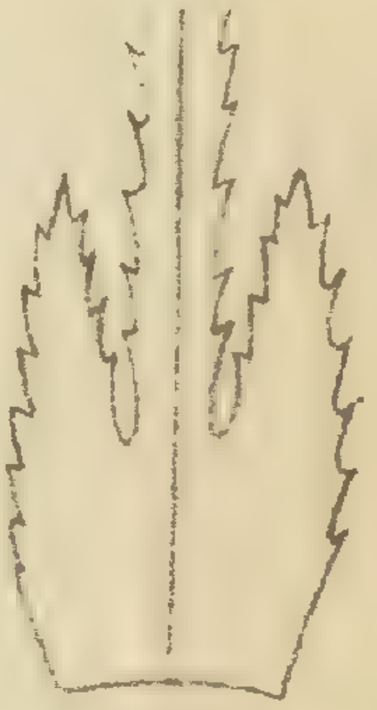

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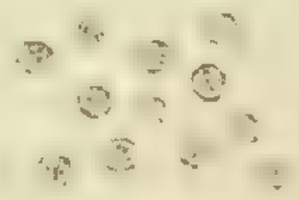

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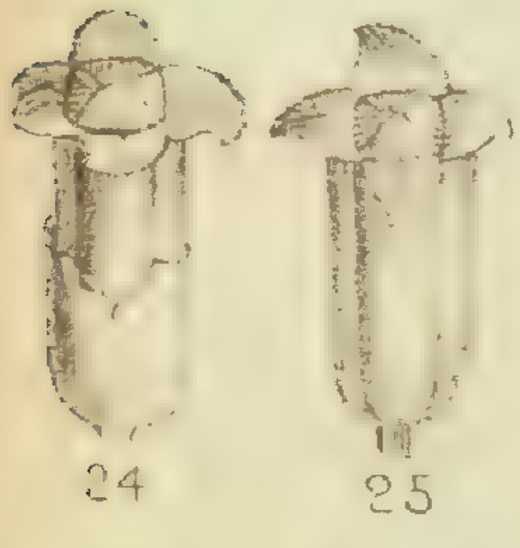

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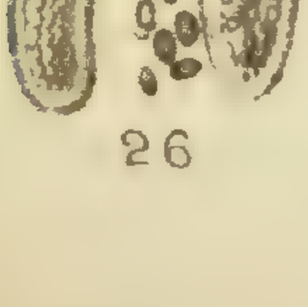

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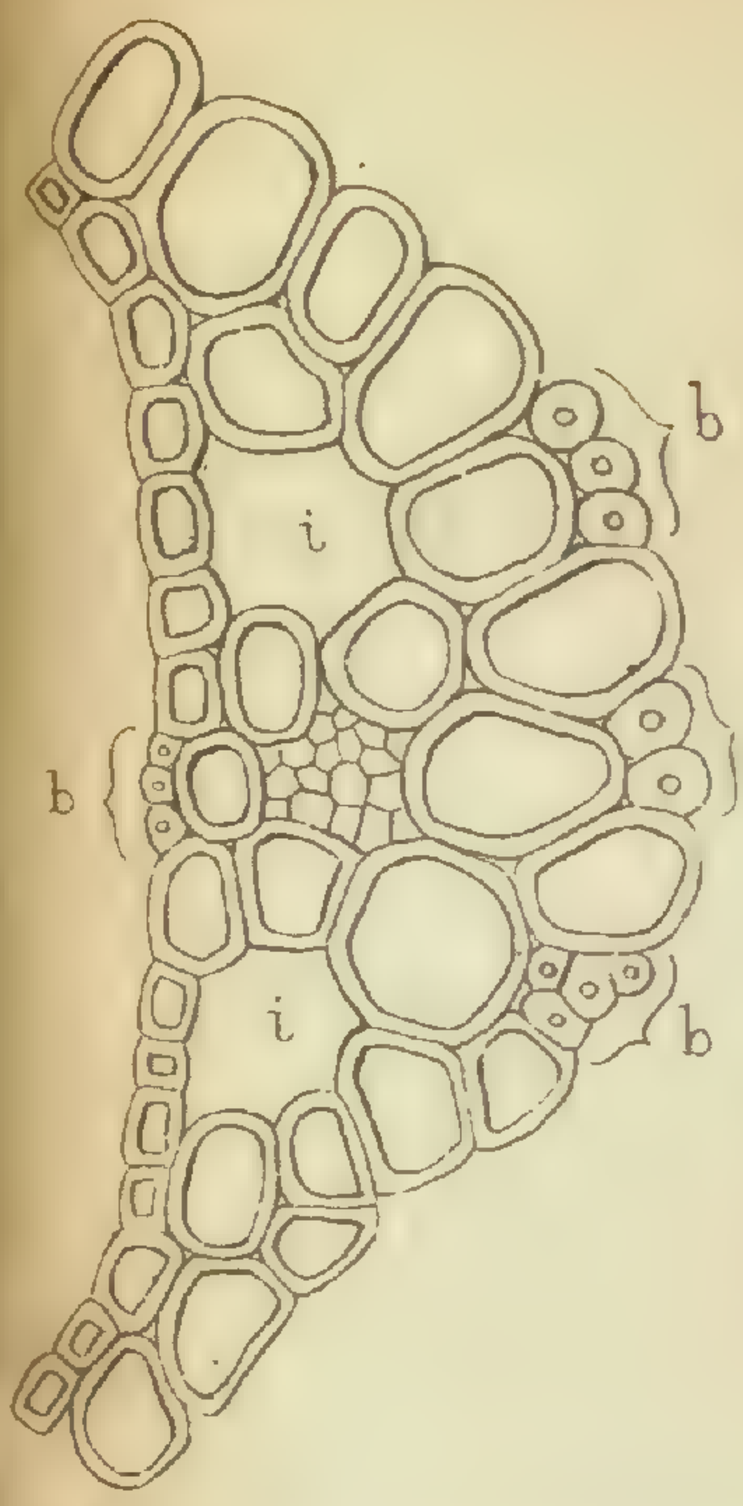

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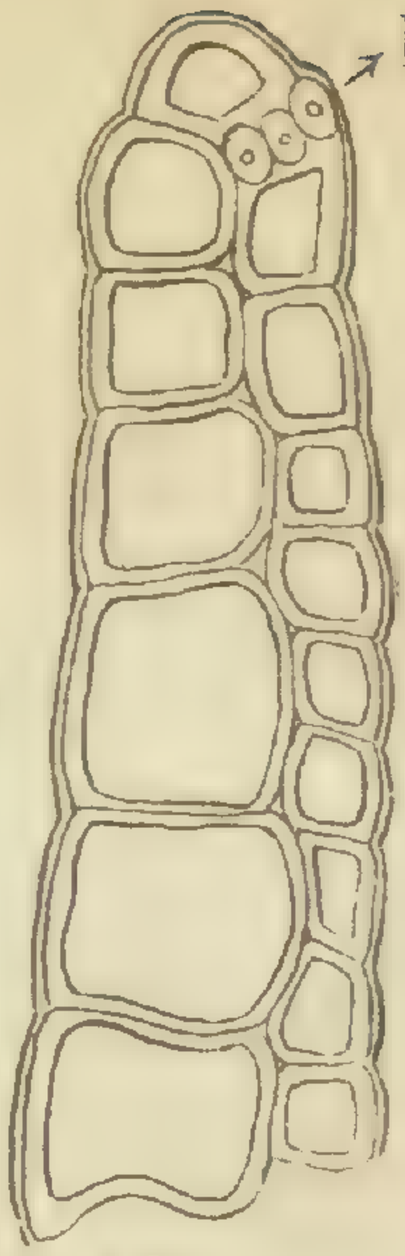

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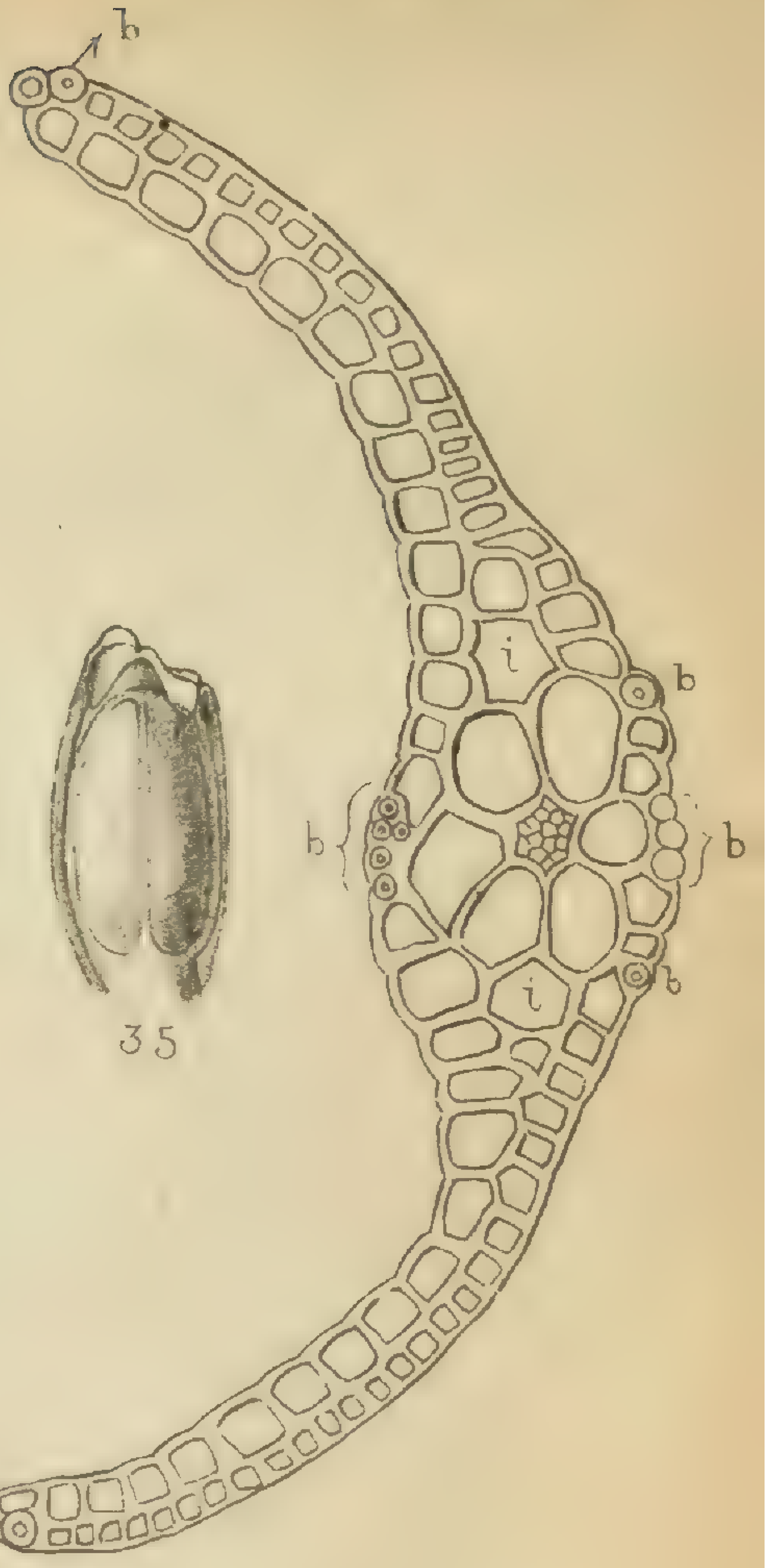

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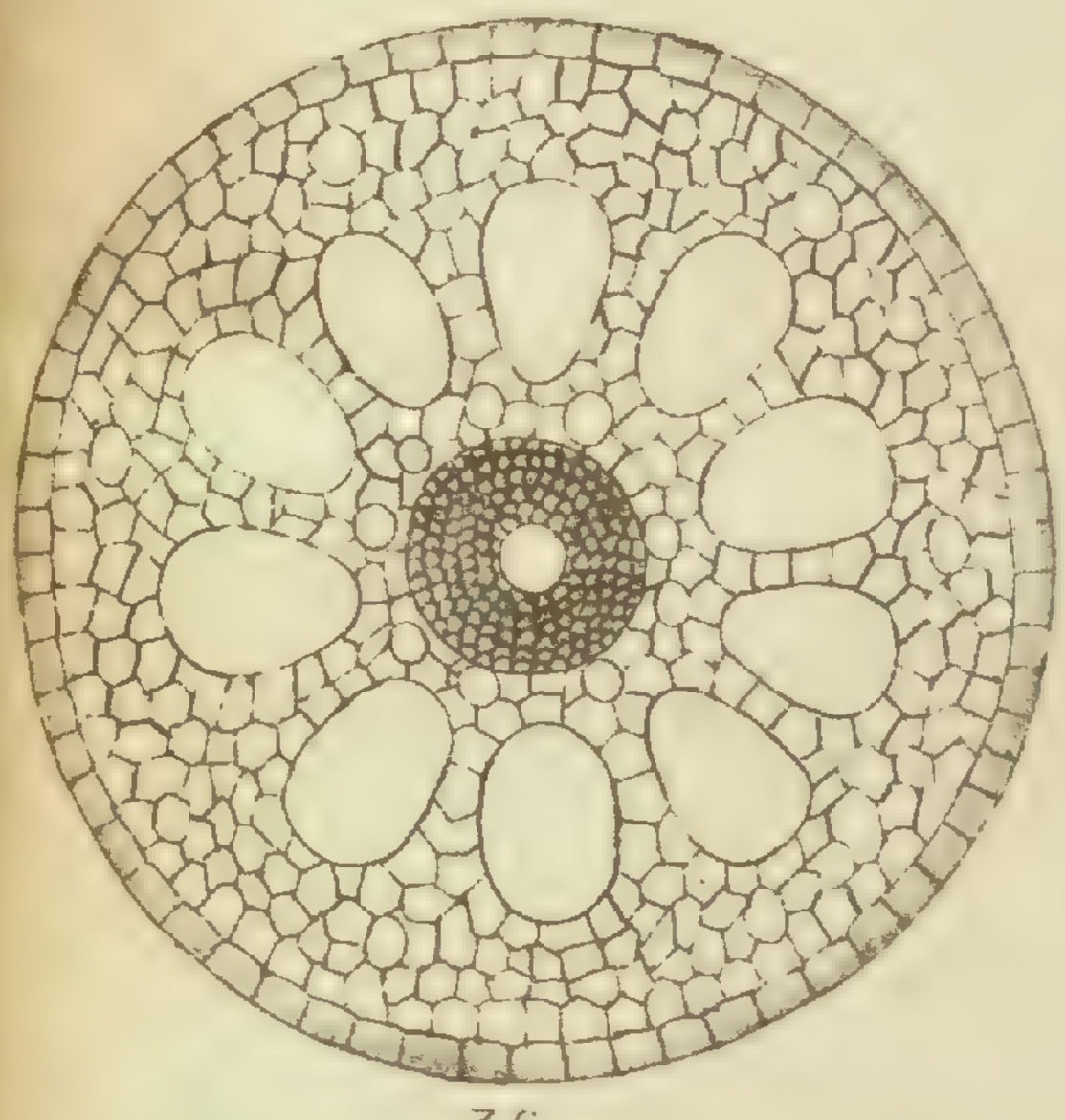

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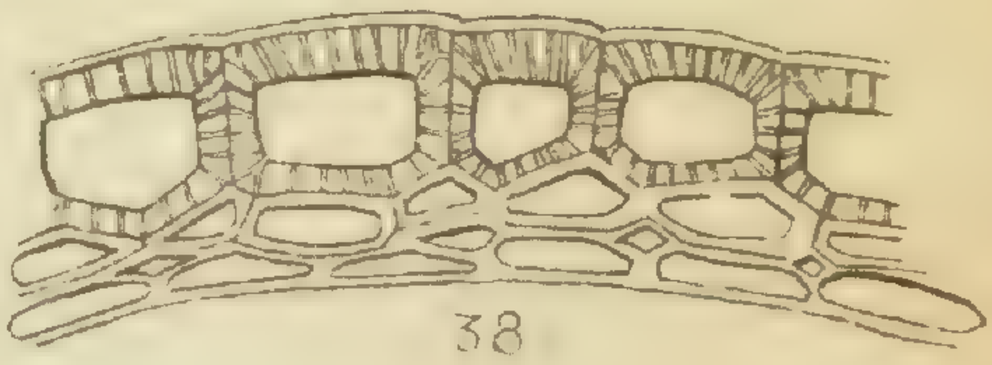

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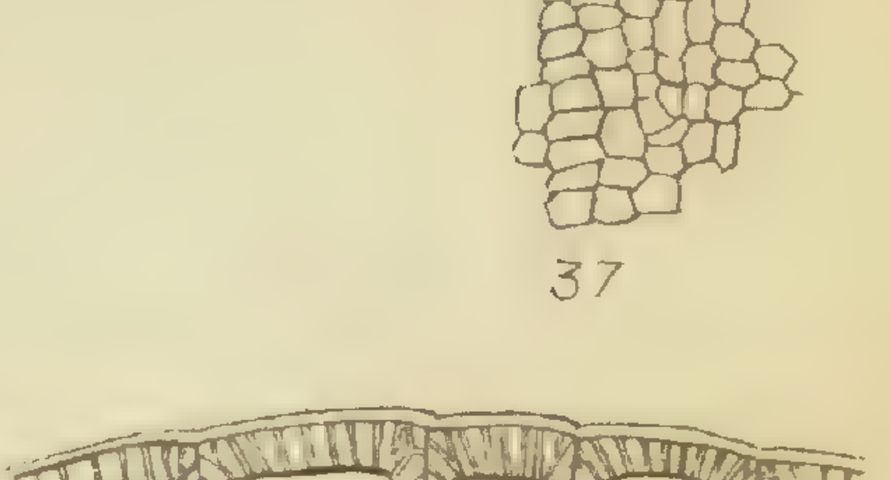

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BRITISH AND FOREIGN.

EDITED BY

JAMES BRITTEN, F.L.S.,

British Museum (Natural History), South Kensington.

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No. 255. MARCH, 1884. Vol. XXII.

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN.

EDITED BY

JAMES BRITTEN, F.L.S.,

British Museum (Natural History), South Kensington.

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BRITISH AND FOREIGN.

EDITED BY

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No. 264. DECEMBER, 1884. Vol. XXII.

THE JOURNAL OF BOTANY BRITISH AND FOREIGN.

EDITED BY

JAMES BRITTEN, F.L.S.,

British Museum (Natural History), South Kensington.

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